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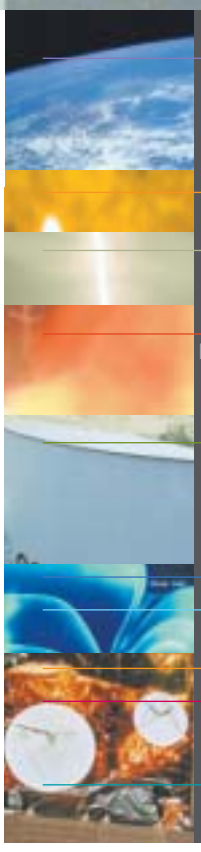

in this issue...

A word from the Director General

Responding to future challenges

Before speaking of the ongoing reform or reorganisation at ESA, or upcoming activities in connection with the next Ministerial Council now tentatively scheduled for 7-8 June 2005 in Berlin, I want first to look back on some of the recent events that have shaped the life of the Agency and to once more give my heartfelt thanks to all the teams concerned.

Thanks to your work and tireless dedication

The launch of Rosetta on 2 March was a huge success involving a near perfect release into orbit. With such precision, the satellite used less fuel and the fuel saved can now be used for future operations. The Mars Express mission continues to provide us with an amazing amount of data, which are greatly appreciated by the scientific community. The discovery of water on the surface of the red planet, traces of methane in its atmosphere, and, thanks to very high definition 3D photos, its geography, have all made a great impression on the general public. We are all now eagerly awaiting the deployment of the MARSIS radar antenna.

Concerning Human Spaceflight, congratulations once again to ESA astronaut André Kuipers and all those whose work ensured that the DELTA mission took place in the best possible conditions. More than twenty experiments were carried out and the results are being analysed. In a final review, the experimenters reported that initial results indicated an impressive 80 % scientific return – an excellent performance for experiments in such an environment. Also the education activities produced a very positive response, not least in the media, with several hours of TV coverage – including during prime time. The education programme included the experiment "Seeds in Space", the radio contact "Zeg het ISS" – which reached out to tens of thousands of primary school pupils – as well as two experiments devised by university students. The DELTA mission education programme was also instrumental in laying the foundations for future, fruitful cooperation between ESA and the Dutch Ministry of Education, and new joint initiatives in the area of space and education are already under discussion.

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COSPAR Scientific Assembly, Paris

An opportunity for everyone

The Committee on Space Research (COSPAR) is a major entity in the world of Space Science. Its scientific assemblies bring together some 1,500 researchers from various space disciplines and from all over the world, to exchange information on the latest progress in space research. The 35th session will be held in Paris from 18 to 25 July. A number of lectures and panels can also be of interest to non-specialists. So if you live or work in Paris, or have the opportunity to come to Paris while the next COSPAR is in progress, why not consider attending some of the lectures and panels open to the general public or even register on the COSPAR website to attend all sessions.

Created in 1958, COSPAR holds its general scientific assembly every two years. Hosted by Houston in 2002, and scheduled for Beijing in 2006, Paris is the chosen venue for the 2004 session. When this decision was taken at the Warsaw 2000 meeting, Antonio Rodotà, ESA Director General at the time, and Alain Bensoussan, the then President of CNES both pledged their full support to the organisation of this 35th COSPAR Scientific Assembly.

The event now has the full support of Jean-Jacques Dordain, Director General of ESA, and Yannick d'Escatha, President of CNES, and also the financial backing of ESA's Directorates of the Science Programme, Earth Observation Programmes and Human Spaceflight. Indeed, this 35th COSPAR Assembly in Paris is an opportunity for the European scientific community to promote its programmes and success stories.

Organised by ESA and CNES, it is also an opportunity for Europe and on this occasion in particular, France to promote their roles as part of those success stories.

The organisation

The objective of the Local Organising Committee, set up in Paris under the Chairmanship of Professor Jean Audouze, was to organise the event in the best possible way within the most reasonable financial envelope. For a meeting with such a large number of participants, the only possible venue in Paris was the Palais des Congrès at Porte Maillot.

The organisers on both sides, ESA and CNES, have had to work hard to reduce logistics costs and find external partnerships. Logistics have been contracted to "Colloquium", a company experienced in organising international congresses, and with which all technical and budgetary aspects have been studied carefully.

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>>> responding to future challenges

The June Council approved the unblocking of exploitation funds for the International Space Station. This decision will allow us to continue our activities in that field, waiting for the restart of the Assembly Sequence. On 17 June, NASA Administrator Sean O'Keefe addressed Council (by video-link) on the US Exploration Programme and ISS. He confirmed his strong interest in international participation, including from Europe, in the United States' vision for exploration. We are developing our own views on space exploration through the Space Exploration Policy Evaluation Group (SEPAG) created in February. SEPAG, which comprises a core and an enlarged group, is made up of several ESA Directorates, our Member States, the European Commission, and representatives of the scientific community and space industry. Discussions are currently under way between ESA and our ISS partners to see how we can best make use of the very important work already carried out in human spaceflight, and microgravity research. Many of you are also studying ways in which we can move on from current programmes and put in place a dedicated European Space Exploration programme and I commend you for the enthusiasm you have shown in that direction.

On the agenda

I would like to draw your attention to a number of important events. On the space science front, there is Cassini-Huygens, the trilateral ESA/NASA/ASI mission. The main satellite successfully released into orbit around Saturn on 30 June Pacific Daylight Time (PDT), 1 July CET, marks the start of the Titan observation mission. This important stage should be followed by the first fly-by of Titan, Saturn's largest moon, at a distance of 1,200 km on 26 October (PDT). Release of the European Huygens probe is scheduled for13 December (PDT); with the final descent scheduled for 24 December. Then, the Cassini spacecraft will start the *grand tour* of Saturn's moons that will end nominally in May 2008. The Double Star mission is currently in progress and the second satellite of the mission, TC-2, is scheduled to be launched from Taiyuan in China on 26 July. SMART-1 is continuing slowly but surely along its trajectory to the Moon. Its entry into orbit around the Moon is scheduled for 17 November 2004. ESA is also very active in the Scientific Assembly of the Committee on Space Research, COSPAR, which will take place in Paris, at the Palais des Congrès, on 18-25 July and which this year we are organising in conjunction with CNES. In Earth Observation, the Radar Altimetry Mission CryoSat has the main objective of determining variations in the thickness of layers of terrestrial and sea ice, and in particular establishing whether global warming is really what is causing arctic glaciers to recede. The launch is scheduled from Plesetsk, Russia, on 21 December 2004. October will see the launch of the ECA version of Ariane 5, for a qualification flight, which will demonstrate that the Ariane 5 Recovery Plan is on track towards a successful completion.

Two new Member States soon to join

The agreement concerning the accession of the Grand Duchy of Luxembourg to the ESA Convention was signed at Headquarters on 6 May by Luxembourg's Minister of Cultural Affairs, Higher Education and Research, Mrs Erna Hennicot-Schoepges. The Agreement with Greece is due to be signed shortly at Headquarters by the Greek Minister of Development, Mr. Dimitris Sioufas. While these agreements await ratification by their respective Parliaments, the two States will benefit from transitional measures to facilitate the integration of their industrial and scientific capacities. During this period, Delegates from Luxembourg and Greece will attend Council and the various Agency Committees and Programme Boards as observers.

ESA and the European Union

One significant event in the past few months has been the entry into force of the EC-ESA Framework Agreement. This is an extremely important instrument for the Agency's future. It notably gives the European Commission the possibility to contribute to ESA optional programmes and ESA the possibility to manage European Community space-related activities. Using the Framework Agreement as a basis, ESA and the European Commission have set up a "High-Level Space Policy Group" gathering representatives from all the ESA and EU Member States. The group will discuss the further development of European Space Policy and prepare the first joint and concomitant meeting of the EU Council and ESA Council at ministerial level. The first meeting is envisaged to take place on 26 November 2004. Another significant event affecting the ESA-EU relationship is the agreement by the European Council, meeting in Brussels on 17-18 June, on a new draft Constitutional Treaty for Europe. The draft Treaty makes reference to space, which is to become a shared competence between the Union and the Member States. It also makes specific reference to ESA, which is an indication of our legitimacy in the overall framework of European institutions. To come into force, the draft Constitutional Treaty will have to be ratified by all 25 EU Member States and might enter into force by 2007.

The need to adapt and the new organisation

ESA must continue to adapt to a constantly changing environment. For me, there are two basic notions: one, that we must increase the added value generated by the Agency, and two, that as an Agency, ESA must form a unified and coherent whole. Among the actions currently being taken to reform ESA, let me first mention the centralisation of budgetary and financial management, the improvement of procurement policy, measures designed to bring greater coherence in science activities, and reorganisation. A Resolution on the evolution of the Agency's financial, budgetary and industrial policies was unanimously adopted by Member States at the June Council meeting. Such reforms will help consolidate ESA's role in defining and implementing a European Space Programme.

The Directors' Committee, focussing on strategy, industrial policy and management, has begun meeting. The Committee meets every Monday. Subjects addressed to date include the Long-Term Plan, preparation of new initiatives (GMES, Telecommunications, Exploration) and the next level of resources (LOR).

The new organisation of the Agency, in force since 1 April, has yet to be completed on an operational basis. The fundamentals are already in place, but some issues still need to be settled. These are in particular the situation of a small number of staff members, which I take very seriously, the organisation of some departments and the way several interfaces are to be defined. The new structure will be fully operational by the end of 2004. The Agency will then be in a better position to respond to future challenges, starting with the preparation of the Berlin Council at ministerial level.

In connection with the reorganisation, I also wish to mention the Villafranca and Redu projects. Villafranca's leading role in astronomy has been endorsed by all our Member States and firm arrangements have been defined for ESAC's future. An overview of the roles of our various centres in the framework of the Networks of Technical Centres, together with the final report on the Redu project, will be presented to Council in October.

New activities

Deciding on the new programmes at the next Ministerial Council will be an important step, safeguarding Europe's continued role in space and its capacity to serve European citizens through solutions offered by space. Decisions taken here on new developments should also receive the financial and technical support they require. This calls for preparatory activities including studies and technological development. Preparatory programmes need to be addressed now for activities to be ready for presentation at the Ministerial Council in 2005.

The three main preparatory programmes to be put into practice for next year are the Space Telecommunications, GMES and Exploration Initiatives. The Space Telecommunications Initiative needs to incorporate in a single coherent approach the technology European industry needs in order to be sufficiently competitive, and the efforts required to reduce the digital divide in European countries. This should be done while making the best possible use of national initiatives and ongoing developments within ESA's ARTES programmes.

The GMES Initiative has just reached the end of its first three-year phase. This initiative will draw on the joint ESA/EC Report on the initial phase and will form the European contribution to the 10-year Plan on Earth Observation defined in the framework of the Earth Summits. The overall programmatic architecture will include space and ground segments which we need to get started and then deploy during the period 2006-2012.

The Exploration Initiative should be a strong and ambitious European programme able to serve as our contribution to an international space exploration endeavour. It will provide synergy between ESA's various scientific activities: space science, Earth sciences, and microgravity science. The content of such a programme must be substantial to enable it to adjust to the changes in the international environment which can affect such vast cooperative ventures. The constituent parts of the Aurora Programme will provide the basis for the preparatory activities. For the time being, the activities envisaged for 2006-2010 are robotic missions, exploration technologies and scientific support.

Sharing the workload

We have a lot of work ahead of us in the coming years and I am particularly concerned to see this work evenly shared across the Agency. Having noted the outcome of meetings of the Directors' Committee and observed the close coordination between Programme and Support Directorates in the various Working Groups, I am confident that the new organisation will progressively take shape, supporting the objectives outlined in Agenda 2007 and that any uncertainty will be merely temporary and will soon disappear. I am counting on the contribution of every one of you. A well-organised and efficient Agency that is in tune with its main partners is in the interests of space, Europe and us all. ■

More stability and strength in Launchers

Interview with Antonio Fabrizi

Antonio Fabrizi commenced his mandate as ESA's Director of Launchers (D/LAU) in June 2003, following his most recent experience in industry as Vice-President of the Space Business Unit of FiatAvio. In this interview, he gives an overview of the current situation of European launchers and outlines plans for the future. He also provides an update on the situation in his Directorate and invites three of D/LAU's younger staff members to give their own view.

ESA Today: ***What is the current situation of the launch vehicles for which ESA is responsible?***

Antonio Fabrizi: Following the success of the Ariane 5 G+ version used to launch Rosetta on 2 March 2004, we are now planning the next two G+ launches. The first of these is planned for the mid-July and the second before the end of the year. These two launches will complete the use of the G+ version of Ariane 5. The first launch of the GS version, the generic "gap filler" for which production has been resumed while awaiting the return to flight of Ariane 5 ECA, should also take place before the end of the year, or at the latest early next year. This will answer the market needs of Arianespace in the course of 2005.

With regard to the return to flight of Ariane 5 ECA, work is progressing well. All the hardware is now ready for integration and is leaving Europe for French Guiana. The flight will take place in September/October of this year.

Concerning Ariane 5 ES for the Automated Transfer Vehicle (ATV), we need a new structure for the Vehicle Equipment Bay (VEB). We also have to complete the qualification for the multiple ignition of the storable propellant Aestus engine. We expect to be ready to fly by October 2005 but this should be in line with a similar schedule for the ATV itself and such a schedule needs to fit in with the Arianespace request to perform a second qualification flight with the Vulcain 2 engine as soon as possible after the first ECA flight to provide the necessary confidence to the users.

Antonio Fabrizi, Director of Launchers (D/LAU)

How do you view the new developments to be undertaken in the Ariane programmes?

AF: I think the main priority in the Ariane 5 programme is to reduce the number of versions and to stabilise the configuration of the launcher. This will allow industry to stabilise production and therefore reduce the cost of production of the 30 launchers according to the commitment industry has made. This refers to the production of the PA batch which includes the Ariane 5 ES and ECA versions. The contract for this batch was signed by Arianespace and EADS-ST at ILA in Berlin (10-16 May).

In principle, we should not take on any additional development activities in the short term to avoid disturbing the configuration of the new Ariane 5 launcher and the related maturing of the production process. Disruptions will nevertheless occur, in the normal course of work, because certain developments will result in minor variations during production of the PA batch, such as the welded joints on the solid booster cases that will feature for the first time on flight 533.

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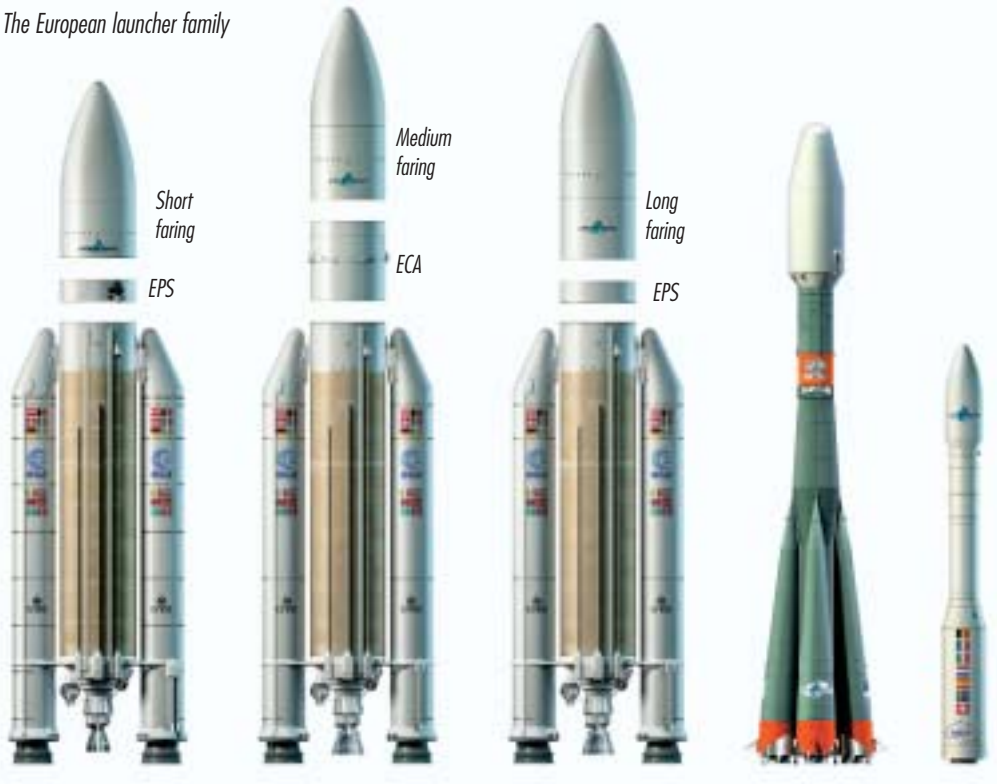
What is the difference between the Ariane 5 G+ and GS versions?

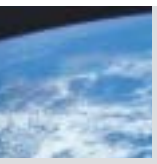
The European launcher family



Both are generic versions using a central core stage (EPC) with the Vulcain 1 engine, two standard solid boosters and the EPS upper stage (the storable propellant stage).

Ariane 5 G+ is an additional production (three launchers) of the generic version (A5 G), whose production ended with the delivery of the 16 Ariane launchers of the production batch P1.

The main differences between G+ and GS relate to the adaptation of the A5 ECA main control stage (EPC) to the needs of the Vulcain 1 engine, which has also been reinforced according to the results of the work done on Vulcain 2.



>>> more stability and strength in launchers

Even if we think that Ariane 5 ECA will be the workhorse of Arianespace, we have to look to the future and work on the basis of market needs. We need versatility for example to launch Galileo in order to allow multiple launches and we must be competitive with other launchers in terms of price. Versatility for the Galileo constellation launch means having a restartable upper stage together with the necessary dispenser to launch up to six satellites with one Ariane launcher at a time into the Galileo operational orbit (24,126 km circular at 57° inclination). This approach is currently being studied with the possibility of using the Russian Fregate upper stage with a dispenser on top of the standard Ariane 5 ECA. This upper stage together with the dispenser has been named "motorised dispenser".

Another alternative could be to resume the development of the ECB version, provided it is ready in time. The ECB is the version of Ariane 5 using the Vinci engine in the upper stage, whose development was slowed down by a decision taken at the Paris Ministerial Council Meeting on 27 May 2003 to give priority to the return to flight of the ECA version. It was decided at the same meeting that ECB development would be resumed once Ariane 5 ECA were qualified. A proposal to resume ECB development could be presented at the next Ministerial Council Meeting in Berlin currently scheduled for June 2005.

Can you comment on the recent developments in the programmes in progress in the field of launchers?

AF: If we focus on technical progress, then special mention should be given to the System Design Review of Vega, which began at the beginning of April. This is a very important milestone. It examines the maturity of the project and the viability of the technical file for hardware production and development testing. The data package that has been presented consolidates the recent work and especially the work of the subcontractors. In the second half of 2004 we shall see the first hardware produced for the first stage motor (P80) and for the three other stages (two solid booster stages and the liquid upper stage "Avum"). I consider that the work on Vega is progressing satisfactorily.

In mid-July 2004, the activities for the launch base, which will be an adaptation of ELA 1, the launch pad used in the past for Ariane 1, will be under way.

Concerning Soyuz at the Guiana Space Centre (CSG) we are progressing with the procurement action and the process to obtain the funding which is still required to complement the level of subscription decided by the Member States at the Council meeting on 4 February. We will shortly be in a position to start work in French Guiana to prepare the Soyuz launch pad. This means that after the summer we shall lay the first stone for the Vega and Soyuz launch pads. During a period when the number of flights is not very high, this will be extremely important for the Guyanese economy.

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The VEGA Integrated Project Team at ESRIN
From left to right: (front row) Gandolfo di Vita (ASI), Pier Domenico Resta (ASI), Amedeo Borghini (Assystem), Daniele Barbagallo (ASI), Anna Marcon (YGT), Michel Bonnet (ESA), Philippe Pascal (CNES), Asier Martin Almansa (trainee), Alessandro Trippi (ESA), Gilles Le Brun (Arianespace), (back row) Daniela Galgani (Kelly), Fabrizio Felici (ESA), Irene Maik (ESA), Roberto Ranz Santana (trainee), Caroline Cros (ESA), Mauro Cardone (ASI), Miguel Lopez (ESA), Antonio Fabrizi (D/LAU, ESA), Didier Coulon (ESA), Stefano Bianchi (ESA), Jean-Michel Monthiller (CNES), Marco Bocciarelli (ESA), Daphné Crowther (ESA), Jean-Luc Parquet (ESA), Massimo Panicucci (ESA), Benoît Geffroy (ESA).

What about future programmes?

AF: Regarding the Future Launchers Preparatory Programme (FLPP), after the subscription obtained at the Council meeting on 4 February we are working to promote the industrial agreements that were anticipated at the time of the Council meeting. This should result in a new system company, 70% owned by EADS- ST and 30% by Finmeccanica. Such a company would provide Europe with a balanced participation from France, Germany and Italy in the programme, leading in the future to a better balanced launchers' sector. I received a presentation of this agreement at the end of April and we informed Delegations accordingly at the May Industrial Policy Committee (IPC). The new entity will be the prime contractor for the New Generation Launcher (NGL).

We are also going ahead with the structuring of the ESA project team, which will be in charge of directing the programme. A number of posts have been opened so as to have staff ready as soon as possible. In the meantime, the statement of work has been prepared. The request for proposal to industry should be issued soon. For the time being, four posts have been opened including that of Programme Manager, for which Jürgen Ackermann has been recently appointed.

The FLPP programme will be based on a collaboration with the Russians and will include the study of new propulsion and new launcher concepts leading to a new generation of launchers. It will also include activities related to the future development of Ariane. There is a link with my previous comment about the post-Ariane 5 ECA activities to be proposed at the Ministerial Council Meeting in 2005.

Marco Bocciarelli, VEGA Programme Controller (LAU-V), ESRIN

"I joined ESA in 1998 as Resources Controller in the former D/TEC and moved to the Directorate of Launchers (D/LAU) in November 2002.

I see my role as one which provides proactive support to the VEGA Programme management on topics like budget management, schedule control and logistics. To efficiently carry out my tasks such as report preparing on planned expenditures, following the approval cycle of an invoice, contributing to contract negotiations or participating in a Tender Evaluation Board, it is essential to establish and maintain good relations with the team, corporate services and the Prime Contractor (ELV Spa Italy in the case of VEGA). I spend a significant part of my time liaising within ESA with Finance, Budget and Personnel and outside ESA with our Prime Contractor counterparts. I view this challenging time for launchers positively and find it motivating because it provides an excellent opportunity to improve the way in which we work.

VEGA is an Integrated Project Team (IPT) composed of members from ASI, CNES and ESA located in ESRIN – as well as three team members based at CNES, Evry. The team has grown significantly over the last year and is now composed of 11 staff members and three Young Graduate Trainees. Eight people from the ESA Technical Directorate (D/TEC), ten from D/LAU and 15 from the Sous-Direction Développement Sol (SDS) at CNES also provide support on a regular basis to the Project Team. The newcomers have undoubtedly brought in that extra energy needed in this important development phase of the programme. The IPT is a unique set-up and represents an excellent learning opportunity for the whole team. I believe this experience will be a great asset for our directorate."

For Soyuz we will also be opening posts to structure the project team under Jean-Pierre Haigneré, who is the Programme Manager. There will be at least four posts. Mention should also be given to re-entry technology. How these programmes evolve shall depend on market changes and also on the future relations we may have with the USA concerning the forthcoming exploration programmes.

For the Ariane programmes, how has ESA's role changed concerning launchers? In particular, how are relations between ESA and CNES evolving?

AF: Concerning Ariane, according to Ministerial instructions, we are progressively moving away from the concept of full delegation to CNES to a situation in which ESA holds entirely its role of client with CNES' assistance regulated through a frame contract. In doing so we have to respect a Ministerial instruction not to duplicate existing resources, to preserve in Europe all competence built by CNES over the past three decades and finally to allow ESA to be able to accomplish the mandate to fully manage the programme with the necessary team.

The D/LAU team at HQ
From left to right: (front row) Guy Ramusat, Marie-Christine Contino, Francesca Giganti, Wolfgang Schwartz, Laura Martina, (second row) Uwe Berkes, Pier Michèle Roviera, Antonio Fabrizi (D/LAU), Tracy Harris, (third row) Lucía Linares, Carole Joppin, Sébastien Brossard, Leandro Sanchez de la Rosa, Alessandro Ciucci, (fourth row) Loïc Bourillet, Romano Barbera, Alessandro Ciucci, Toni Tolker-Nielsen, Jacques Gigou, (fifth row) Giovanni Carra, Bernadette Batteux, Florence Lebrun, Luisa Innocenti, Bruno Gardini, Annie Bernard, (sixth row) Christian Dujarric, Marc Bertschi, Éric Lefort, Yves Martinie, Ann Nilsson, (back row) Jean-Pierre Haigneré, Marc Toussaint, Ricardo Corrente. Missing from the picture: Rüdiger Albat, Didier Coulon, Nicole Lamoureux, Julio Monreal, Andy Veenhoff and Jürgen Ackermann.

In the European Launchers Sector, the ESA project team must become the new hub of the system. ESA is the customer; CNES is supporting the customer especially on technical matters; industry is in charge of implementing development and production work and Arianespace of commercial exploitation. The project team must be able to bring all these resources together. We need a real European team whose common objective is to maintain and guarantee access to space for European institutional missions and to maintain access to the commercial market to obtain further financial resources for the entire system.

The seminar with CNES organised at the end of April 2004 helped us to further discuss the aspects related to this relationship. We also had a seminar with Arianespace for the same purpose. We have been working since October 2003 on the Polestar project (the objective was to review all the processes concerned with launchers' development, production and commercial exploitation) to map the process and so to clearly identify the boundaries of the responsibilities of the different actors. This was the basis of the discussions with Arianespace, CNES and industry to make sure that each of us is restructuring to play the role requested of us.

Do you intend to restructure your directorate to adapt to the new organisation of the Agency? How are you going to proceed?

AF: Yes, the directorate is being reorganised. There are currently 55 staff members in D/LAU based at HQ, ESRIN and Kourou plus six non-ESA staff integrated in the organisation and we are due to expand to 80 by the end of 2005. As we are already working on the basis of project teams such as Vega and using technical resources from CNES or ESTEC in a sort of matrix type organisation, we are likely to encounter fewer hurdles than other directorates when it comes to adapting to the reorganisation of the Agency. I feel it will be relatively easy for us to make the transition. The new structure is based on the existence of four project teams, namely Ariane, Vega, Soyuz and Future Launchers. These teams will be structured according to the new organisation of ESA, meaning programme management, system engineering, project control. We will use the resources of external entities like CNES, ASI and DLR for technical aspects. Further expertise from other ESA directorates such as D/TEC for technical matters, D/RES for financial and contractual aspects, together with the Legal Department, will support our work.

In the reorganised D/LAU there will also be some horizontal functions such as policy aspects, industrial relations, future programme preparations, long-term planning, Council and Programme Board preparation, communication, consolidation of the data of the various project teams and also secretarial support. Another horizontal organisation will be the management of ESA assets, all ESA property that has been put at the disposal of industry in terms of production facilities or launch site facilities. These concern not only Ariane but also Vega and Soyuz.

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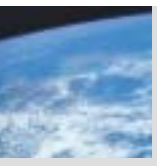
Lucía Linares, Administrator in the Launcher Policy Office, Policy and Plan Department (LAU-S), HQ

"I joined ESA in 2001 and moved to the Directorate of Launchers in May 2003, just before the ESA Ministerial Council Meeting in Paris.

To face certain challenges and better respond to launch-related needs, the European launcher sector has introduced a number of new measures for the reorganising of the sector, which is now well underway. Such measures include the approval and recent subscription of new programmes such as the European Guaranteed Access to Space (EGAS), Soyuz at the Guiana Space Centre (CSG) or Future Launcher Preparatory Programmes (FLPP) and the beginning of international cooperation with the Russian Federation in the field of launchers.

Since I arrived in D/LAU, over one year ago now, after almost two years in the former Directorate of Administration, I have had the opportunity to participate in these processes. My work involves monitoring the evolution of the launcher sector, contributing to the ESA decision-making process and interfacing with certain ESA Member States. I also take part in negotiations with the European Commission on international launcher policy, exploring potential fields of cooperation with non-Member States and proposing actions to be taken towards them.

I find my work highly motivating for a number of reasons. Firstly, it is demanding and dynamic requiring constant analysis. Secondly, the feeling of being close to ESA's core activities is stimulating in itself. Thirdly, and in my mind most importantly, it is great to work with outstanding colleagues in a directorate where there is a real team spirit. Despite minor uncertainties due to the ongoing restructuring in the directorate, the feeling in D/LAU is generally team-oriented and enthusiastic."



>>> more stability and strength in launchers

I have already had the opportunity to explain the principles of this new organisation to my staff and to the Programme Board. The "Admin" has just been issued and this new organisation is now in place.

What is the experience in your Directorate concerning Integrated Project Teams?

AF: The Vega Project Team, integrating actors from CNES and ASI, can be held up as the pilot case and model for other Integrated Teams. Our experience in this sense has been good even if difficult at times. Integrating different cultures is not easy but useful because, when you have a melting pot, in the end you manage to get the best from everybody and I think this is a good thing. This concept can be extended to other programmes where ESA core resources can be complemented by national agencies' skills.

ESA Director General Jean-Jacques Dordain and Jean-Yves Le Gall, Director General of Arianespace sign an agreement on European Guaranteed Access to Space (EGAS).

Rosetta V158 launch

You spent most of your career in industry. Did coming to work at ESA represent a big change for you?

AF: Before joining ESA last year I'd worked for nearly 30 years in industry. I started as a design engineer on an ESA programme called MAGE, an orbital circularisation solid booster motor. Since 1975 I've been actively working with international teams on ESA programmes. The driving force in my professional life has been my passion for space propulsion and Europe's role in space. Working in ESA is basically another way of living this passion. What I've found in ESA is a pleasant group of young, open-minded, competent people who share the same passion as me. In life we all spend a large part of our time working and being passionate about our work is an essential way to live well and do well. What has been new and different for me is the relationship with the Delegations. Dealing with 15 Member States and their different political motivations has added a new aspect to my professional life but as Delegates also share my passion, I ultimately feel we are all colleagues with the same objectives.

What is your opinion of the teams you are now in charge of?

AF: I am very happy with my team and I hope the feeling is mutual! I believe in the importance of personal relationships and when I arrived at ESA I tried to meet each staff member individually. I haven't yet managed to get to spend time with each one as my professional commitments have taken over, but with time I feel that I will get to know everyone well.

Sharing and communicating are essential in any organisation but in particular in ESA. By virtue of working at ESA we share the common objective of doing something for Europe in space. For all of us to be able to move in the same direction and be successful it is important to share information, to make sure that we know each other and that we act as a real team. On the subject of communicating, we tend to formalise too much and we must remember that we are humans and need personal relations as well. Although time-consuming, I believe this effort to be worthwhile. ■

Michel Debraine, System Engineer (LAU-K), Kourou

"I joined the Directorate of Launchers at the ESA Kourou Office in September 2002. In a way, this assignment is like a homecoming since I already worked in the former Space Transportation Systems Directorate (D/STS) on the Hermes project 13 years ago.

I started at ESA in 1987 as part of the ISO satellite project team in the Science Directorate, ESTEC. In 1991, I then moved on to work as System Engineer on the Hermes project in Toulouse. Following that, I worked on the Atmospheric Re-entry Demonstrator (ARD). After the launch of ARD in October 1998 on board Ariane 503, I then furthered my experience in launch operations when seconded by ESA to CNES as Ariane Base Operations Manager (DDO) for three years, and finally joined the ESA Kourou Office.

As system engineer, my work involves controlling and monitoring all the technical and operational aspects of the contract between the Agency and CNES dealing with the maintenance in operational conditions of the European Spaceport. I also provide support and follow up the Vega and Soyuz ground segment development.

Times are changing for the launcher sector, and obviously this greatly affects the European launch base in Kourou. We are currently in the midst of restructuring the base to welcome the next batch of Ariane 5 and the new family members, Vega and Soyuz. What I find extremely stimulating is both being a player in this reshaping process and being part of a small team on the operational side. When a decision is taken I can physically see the changes that arise from it. Work on the Soyuz project started a short time ago and is already visible and work on Vega will start very soon.

I am convinced that it is important for the European launcher sector that ESA fully takes on its new role in this field. With the diversification of the European launcher family (Ariane 5 ECA, Vega and Soyuz) all soon to be based at the Guiana Space Centre, ESA will be required to play a more significant role in Kourou."

ESA and EU enlargement

Should ESA expand?

by **Jean-Pol Poncelet**, Director of External Relations (D/EXR)

Political Europe, represented by the European Union, has recently expanded to include ten new members. This marks the definitive end of the division of Europe established at the Yalta Conference. The question of the Agency's enlargement in the same direction very naturally springs to mind. So should ESA follow suit and extend eastwards?

A single Europe, several models

The European Union illustrates a totally unique type of political integration: it implies a "supra-national" nature, which is expressed mainly by a partial rejection of sovereignty by its member states. Those governments that have opted for the Euro, for example, have given up their sovereign right to mint currency, to the advantage of Community institutions. Progressively, these institutions are going to make majority decisions more and more often.

For its part, the European Space Agency embodies European Space, based on the intergovernmental model, with undeniable

Signing of the European Cooperating State Agreement (ECS) between ESA and Hungary by Kálmán Kovács, Hungarian Minister of Informatics and Communication and Jean-Pol Poncelet, ESA's Director of External Relations, Budapest, 7 April 2003.

success. Its members decide, as sovereign states, what they are willing to do as a group, on a case-by-case basis. This obviously brings up the question of unanimity and the inherent difficulties of consensus. For ESA, cooperation involves an extensive technological and industrial content in particular, which accentuates national interests and weighs on the decision-making processes.

The increasingly close ties between the Union and the Agency in recent times, formalised by a framework agreement, indicate the wish to benefit from each other's strengths; political weight on one side, technical and scientific expertise on the other.

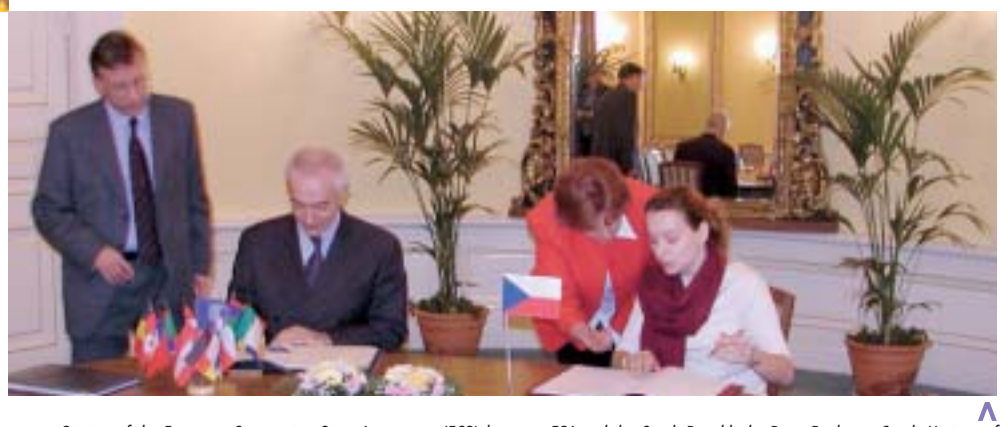
The bringing together of these two models is not new. It is in fact an inherent part of the building of Europe, testified by the Schengen Agreements or the single currency, which do not yet include all EU Member States. In addition, the new Treaty of the Union intends to devote more of these "strengthened" or "structured" cooperation forms in accordance with the intergovernmental methods, only to those countries which are favourable.

A common base

Historically, the composition of the Agency has also been a progressive process. Just recently Luxembourg and Greece signed the ESA Convention. The Union and the Agency now have a common platform of fifteen "historical" members.

Recognising the strong interest in space of some of the new members of the Union, the Agency has been keen to respond to their wish to establish a closer relationship. ESA has put forward a "Plan for European Cooperating States" (PECS), which provides a specific status for these potential candidates who might join in the future. Despite their lack of industrial backing, they can still take part in some of the Agency's projects with limited funding, and in this way become better acquainted with ESA. Hungary and the Czech Republic are already part of this process; Poland and Romania may follow suit.

Furthermore the EU – then with its fifteen members – and ESA have already agreed to cooperate on the Galileo



Signing of the European Cooperating State Agreement (ECS) between ESA and the Czech Republic by Petra Buzkova, Czech Minister of Education, Youth and Sport, and Jean-Pol Poncelet, ESA's Director of External Relations, Prague, 24 November 2003.

Programme, which they fund on an equal basis. The ten new states, now part of the Union, have also been asked to support ESA's GalileoSat Programme, in order to take part in the development and validation of the in-orbit operations phase and the ground segment associated with the future satellite constellation. However, the current state of their industrial structure and their lack of financial resources may prevent them from receiving a fair share of the work, which is an essential right under the Agency system.

Convergence?

There is a risk that the difficulties we face today over the Galileo Programme – the first to involve a new distribution of roles between the Union and the Agency – could multiply with future joint programmes, like GMES (Global Monitoring for Environment and Security), or the efforts designed to rectify, by satellite, discrepancies in access to broadband services, commonly known as "digital divide".

In each case, the new EU member countries will be fully-fledged partners in the decision-making process on the Union's side. Can the Agency afford to ignore them in the long term?

As can be seen, it may be necessary to set up a specific mechanism to allow ESA to satisfactorily address the requests from these new EU members for greater cooperation. The terms of application of the PECS system, conceived before they joined the Union, risk becoming inadequate very quickly. For some they are already proving too complicated, while for others the cooperation they offer is too limited.

Throughout all these mainly technical considerations a clearly political question arises. If, as a result of its Convention, the Agency and its Member States aim to build together the Europe of space science and technology, can this be achieved without a certain degree of harmonisation with the efforts that these same partners are making to equip themselves, through the Union, with broadly integrated political structures? In other words, can the diverse and multiple forms that the construction of Europe could take allow for non-convergence in the long term?

A political question requires a political answer. The Member States, key players in this dual strategy, will have to be the deciders. How can they reconcile political interest by welcoming the countries of the enlargement into ESA, in compliance with the required procedures, without creating unrealistic expectations? With 25 members, how to avoid falling into the trap of blocking the decision-making mechanisms and paralysis of the system? This is a serious challenge, both for ESA, and for the Governments, which remain very protective of their national interests… ■

Paving the way to the Moon and Mars

ESA's vision of Space Exploration

Conversation with Daniel Sacotte, Director of Exploration (DG-E)

ESA Today: ***Why should space exploration continue?***

Daniel Sacotte: Throughout the ages, the human desire to explore and understand has been constant. Among the countless recent achievements, man has journeyed to the Moon and has established a permanent presence in Low Earth Orbit (LEO). The next stage will allow a better understanding of life in the universe and our efforts will be concentrated in particular on the planets where life might have existed. In this field, the ongoing exploration of Mars is yielding fascinating results and the Moon represents the next settlement for humankind. Such endeavours are a major challenge requiring both robotic and human exploration, and will call for massive technological advancement to overcome the risks of travelling to and one day living in Deep Space.

Space exploration is clearly identified in the European Commission's "White Paper on European Space Policy" as an important aspect for the future, giving full backing to our initiatives in this field.

What is the European Space Exploration Programme?

DS: Director General Jean-Jacques Dordain proposed three new initiatives at the March Council meeting in Kiruna. One of these was related to the preparatory phase of a European Space Exploration Programme and was on the agenda of the Council meeting on 16/17 June. These preparatory activities build on the work carried out so far in the framework of the Aurora Programme will allow us to define a European Space Exploration Programme proposal at the next Ministerial Council meeting in 2005.

Since 2001, within the Aurora Programme, ESA has been working on the preparation of a long-term exploration programme. As several major ESA programmes were nearing the end of their development phase, it was important to begin preparing the future. Over the years, Europe has acquired the industrial and scientific capabilities to play an even greater role in Space. We are in a position to be a key partner in an international endeavour leading to robotic, and eventually human exploration of the Moon and Mars. Our goal is however to reach a full understanding of all the elements of an exploration programme in order to decide where best to use our resources. We envisage the development of "building blocks" (i.e. single missions or major mission elements or technologies) that will constitute the elements of a flexible and robust scenario for exploration and for an international cooperation framework.

What is the link with the Aurora Programme?

DS: The new preparatory phase incorporates elements from the Aurora Programme. More generally, it is thanks to the Aurora Programme that Europe is well advanced on the subject of space exploration, with full involvement from the scientific, industrial and academic communities. Therefore, when the USA announced its new vision for space exploration in January 2004, ESA and Europe felt in a position of "readiness." In addition we retain, for instance, the same external advisory body, the Exploration Programme Advisory Committee (EPAC), chaired by Professor Jean-Pierre Swings of the University of Liège, to capitalise on its experience. The Aurora Programme Declaration will be used as the legal framework to carry out further preparatory activities that will lead to a fully-fledged Programme Proposal for the European Space Exploration Programme at the next Ministerial Council meeting.

Who is now in charge of the Preparatory European Space Exploration Programme?

DS: Exploration calls for a multidisciplinary approach and therefore several directorates are involved in the activities: the Directorate of Human Spaceflight (D/MSM), the Directorate of the Science Programme (D/SCI), the Directorate of Technical and Quality Management (D/TEC) and the Directorate of External Relations (D/EXR). In due course I think we will need an organisational structure more in line with the multidisciplinary nature of exploration activities. Over the next few months however we have to concentrate on preparing the Programme Proposal and the Ministerial Council, not only from a technical and programmatic point of view but also as far as financial, legal and political aspects are concerned. Luckily, I can count on a motivated, dynamic and competent team.

I have entrusted the coordination of the preparatory phase of the European Space Exploration Programme to Dietrich Vennemann.

Alain Pradier, who was already in charge of technology developments on the Aurora Programme supports him. The team, comprising staff from D/SCI, D/TEC, D/MSM and the former Directorate of Administration (D/ADM), is located in ESTEC and Headquarters.

This team will be integrated into the future Human Spaceflight, Microgravity and Exploration Directorate (D/HME) later this year. ■

>>> 35th COSPAR scientific assembly

Institutional partnerships have been established with the French Ministry of Research and New Technology, the French Academy of Science, the Ile de France region and the Mairie de Paris, not forgetting contributions proposed by Eumetsat and the French National Scientific Research Centre (CNRS). Industrial partnerships will be forged through the support of the French Association of Aeronautical Industries (GIFAS). Companies already working with ESA, such as Serco and Sodexho, will also contribute to costs: Serco will install a "Cyber Space" section with 20 computers; Sodexho will provide the catering at very reasonable prices.

Model for the ESA-CNES welcome area at COSPAR

In addition, ESA and CNES will present a joint exhibition on space science programmes and various partners will also have the opportunity to present their activities.

Besides interdisciplinary lectures, panels and the scientific commissions, there will also be a large poster area for scientists to present their research. ■

The programme opposite only represents a part of what COSPAR 2004 will offer. For the complete programme and practical information, please visit the COSPAR website at: http://www.cospar2004.org

contact

Jean-Paul Paillé
ESA Representative
COSPAR 2004 Local Organising Committee, HQ
Ext: 9 72 57

Programme

Sessions open to the general public

Interdisciplinary lectures

One-hour interdisciplinary lectures will be given every morning at 8:30:

- *20 July - 8:30*
"The Rise of X-Ray Astronomy" by Riccardo Giacconi, Physics Nobel prize 2002.
- *21 July - 8:30*
"First results of Envisat" by Paul Crutzen, Chemistry Nobel prize 1995.
- *22 July - 8:30*
"The chances of finding signatures of life in the Universe / Astrobiology" by Frances Westall, Micropaleontologist, Director of Research, CNRS.
- *23 July - 8:30*
"Solar radiation and Climate" by Claus Fröhlich, Senior Scientist at the Davos Observatory, Physikalisch – Meteorologisches Observatorium Davos (PMOD) and at the World Radiation Centre (WRC).
- *24 July - 8:30*
"Studying the Ocean – From observation to prediction" by Jean-François Minster, Chairman of the Board and Executive Director of IFREMER (Institut Français de Recherche pour l'Exploitation de la Mer).

Panel events

One (or two)-hour panels will take place every day:

- *20 July - 17:30*
"The Future of Space and International Cooperation" with Roald Sagdeev, Marc Allen, Jean-Jacques Dordain, Yannick d'Escatha, Mian-Heng Jiang, Sri G. Madhaven Nair, Lennard Fisk, Koichiro Tsuruda.
- *21 July - 18:30*
"Space Sciences in Europe" with Jacques-Emile Blamont, Bo Andersen, Gerhard Härendel, David Southwood, Lev Zelenyi.
- *22 July - 18:30*
"The Future of Humans in Space and the Role of the ISS" with Christophe Salomon, André Brack, Jörg Feustel-Büechl, Rupert Gerzer, Jean-Pierre Haigneré, Jeffrey Hoffman, Sergei Krikaliev (tbc).
- *23 July - 18:30*
"Highlights from the recent Mars Missions and the Future of Mars Exploration" with Wesley Huntress, Agostin Chicarro, Marcello Coradini, Daniel McCleese, Vassily I. Moroz, Ichiro Nakatani, Colin Pillinger, Steven Squyres.
- *24 July - 13:00*
"The Role of Space in Monitoring Global Change" with Guy Duchossois, José Achache, Tony Hollingsworth, Hartmut Grassl, Jack Kaye, Thomas Rosswall, Daniel Vidal-Madjar.

Sessions open to registered participants

Scientific experts from all over the world will actively participate in the scientific commissions, technical panels and special sessions.

Scientific commissions will examine themes such as Space Studies of the Earth's Surface, Meteorology and Climate; Space Studies of the Earth-Moon System, Planets, and Small Bodies of the Solar System; Space Studies of the Upper Atmosphere of the Earth and Planets including Reference Atmospheres, Space Plasmas in the Solar System, including Planetary Magnetospheres; Life Sciences as Related to Space; Materials Sciences in Space; Fundamental Physics in Space.

Panels will address Satellite Dynamics, Scientific Ballooning, Environmentally Detrimental Activities, Research in Developing Countries, Standard Radiation Belts, Space Weather, Planetary Protection and Capacity Building.

Further to this, future international collaboration between scientists and engineers will be discussed during special business meetings.

About COSPAR

For those of you who are less familiar with COSPAR, here are a few quotes from key personalities involved in the 2004 session of the Committee:

"Our Committee will be part of this renovation and redefinition phase that is currently emerging in the space sector. Its interdisciplinary nature, in a time of expansion, in some ways perhaps limits the opportunity for specialisation, but offers … a unique structure allowing the pursuit of increased and broader collaboration in space research," says **Professor Roger-Maurice Bonnet**, elected Chairman of COSPAR.

Professor Jean Audouze, Chairman of the Local Organising Committee, underlines that *"space facilities have become indispensable tools for scientists and engineers wishing to understand the Earth since they offer a global vision of our planet. The many advantages offered by these facilities enable them to meet the aspirations and needs of people in different ways, whether for managing natural resources, monitoring changes in the climate and the environment or providing telecommunications services, among others. Further space research promises to provide a unique means to explore and study the Universe as a whole."*

Yannick d'Escatha, President of CNES, remarks: *"Research is fuelled by human aspirations and space exploration is the ultimate expression of what constantly drives us on to see what lies beyond the horizon. To pursue this never-ending quest, researchers in science laboratories need tools that push technologies to their limits, to help increase industrial know-how by constantly setting new challenges."* […] He hopes that *"the work, exchange and dialogue… will foster innovative ideas to help space stakeholders worldwide better manage our planet and plan effectively for the future."*

According to **Jean-Jacques Dordain**, ESA's Director General: *"It is hardly surprising, when 1,500 and more scientists from all corners of the globe decide to gather in Paris to exchange ideas, build for the future and maybe even dream together, that ESA should give the event its fullest backing, in close cooperation with CNES…"*

Photo of the Earth taken by ESA Astronaut André Kuipers on board the ISS. The Soyuz TM4 can be seen on the right.

Behind the scenes of an ISS mission

The 11-day DELTA mission to the ISS came to a successful conclusion on 30 April 2004 when the Soyuz return module carrying Dutch ESA astronaut André Kuipers touched down in Kazakhstan. But for certain mission players the work continues. Sending an astronaut to the ISS is a major operation requiring months of planning, preparing and team coordination. ESA Today takes a closer look at the role of several key people involved in such a mission ranging from the planners and operations manager to the surgeons and logistics supervisor.

Reinhold Ewald, Operations Manager for ESA Soyuz Missions (MSM-AA), EAC/ESTEC

"Our main task is to provide the best possible support to our colleague in space using all available means", explains Reinhold Ewald, Operations Manager for ESA Soyuz Missions. "While the most visible link for the public is the voice exchange with the crew on the ISS, there are a number of other ways of communicating with the astronauts. On board they have access to a detailed timeline on the PCs *(see The European Planning Team)* and stay in touch with the ground via two daily voice calls, called the Daily Planning Conferences (DPC). During these calls activities are either confirmed or last minute changes made. During the Delta mission the evening DPC took place from the Operations Manager's console at the Delta Payload Operations Centre (DPOC) at ESTEC."

"Most conversations between myself and the astronauts are on open loop (all participants can listen in) and are confined to the exchange of technical information. In less formal conversations, mainly through the Russian communication means, we may speak briefly about any significant successes the astronaut has achieved or give him some news from the ground to keep him motivated. In addition to these conversations, there are private (encrypted) Medical Conferences for the astronauts with the ESA flight surgeons in EAC and Moscow."

"We have to pay a great deal of attention to what we say during these conversations as they could influence subsequent actions on board or even be misconstrued by the crew. This is why it is best to have fellow astronauts acting as interfaces. At least they know what it's like to be "up there." During André Kuipers' flight, four ESA astronauts worked in two shifts to perform this task."

"For all missions to the ISS, the longest lead times are required for ground infrastructure preparation and procedure writing for experiments. The Delta mission used the already available Columbus ESA ground network (the so called ESA Phase 1) to connect with the control centres in the US, the Johnson Space Centre in Houston and the Marshall Spaceflight Centre in Alabama and TsUP in Moscow. Two simulations and a test procedure called "the Certification of Flight Readiness" were carried out in March and April. The "instructions for use" were written and tested according to input from the experiment experts. Around two weeks before launch the crew has the flight copy in their hands."

Operations Manager Reinhold Ewald assisted by Hilde Stenuit for crew procedures and operational support.

"Following the astronauts' return to Earth we celebrate the success of the mission. Then a series of debriefings take place for the crew in Russia and the operations team at ESTEC. For the human physiology experiments, the crew undergoes post-flight baseline data collection so that the experimenters can compare the in-flight data with pre- and post-flight measurements."

Elena Grifoni, Head of ISS Utilisation Strategy and Education Office (MSM-GS), ESTEC

"Preparations for the educational component of a mission to the ISS begin about one year prior to the launch date," explains Elena Grifoni, Head of ISS Utilisation Strategy and Education Office, ESTEC. "In the case of the Delta mission this took place at the same time as the negotiations with the Russians, the Dutch authorities and ESA mission management."

"Education has been a recognised priority for ESA and the ISS Programme since the Odissea mission with ESA astronaut Frank de Winne in October 2002 when we first began its development. The Odissea mission is a cornerstone of the Space Station Education Programme," says Elena Grifoni. "Following Odissea, we set up a complete education programme for the Cervantes mission with ESA astronaut Pedro Duque in October 2003. Activities covered primary, secondary and third level education. This same model was then used for the Delta mission and included radio contact for primary school children, physiology experiments for secondary schools, technology and biology experiments provided by university students."

Elena Grifoni, Head of ISS Utilisation Strategy and Education Office

"Data gathered from the university student experiments will be analysed by the students themselves and we hope to have the results published. We intend to have a DVD of the mission presenting the secondary school physiology experiments for distribution to schools in Europe before the end of 2004. The educational material produced to support the primary school activities will be adapted to feature on the ESA education website."

"Probably the most challenging aspect of this type of mission is interfacing with our Russian counterparts and the complex, multi-organisational structure we have to deal with," explains Elena Grifoni. "The limited contact with André Kuipers who carried out our experiments, is also a challenge. On top of that there is the language barrier and the time factor. I have to say that the team gets better with each mission and I think that our Russian colleagues are pleased to see this!

"The bulk of my work takes place before the mission, but I was directly involved in the activities for primary schools (the amateur radio contact) for two days during the Delta mission. I only intervene if there is a problem. So, the smoother the mission, the smaller my role! And this was the case for the Delta mission."

The European Planning Team (EPT)

Giovanni Gravili, Lead 8S (8th Soyuz mission) Planner (MSM-EO)
Alessandro Buccini, 8S Pre-Increment Support Planner (MSM-EO)
Assunta Sicilia, Real-Time Ground Operations Planner (MSM-EO)
Warren Chell, Real-Time Support Planner (MSM-EO)

The European Planning Team (EPT) performs the Execute Level Planning function related to Soyuz and ISS missions. During the pre-mission planning phase, EPT is in charge of scheduling all ESA experiment activities to be performed by the ESA astronaut during the mission. In the case of the Delta Mission these activities are compliant with the Dutch Soyuz Mission (DSM) programme as defined by the Principal Investigators.

Giovanni Gravili, Lead 8S Planner explains, "It is our responsibility to fully understand the experiment requirements and to build the associated activity models (e.g. activity name and duration) initially planned for a particular day, and ultimately scheduled for a specific time on that day." This process includes identifying activity constraints, and producing an ESA timeline input that satisfies such constraints without violating generic, pre-defined crew scheduling constraints (e.g. length of working day, meal times and exercise periods).

Warren Chell, Real-Time Support Planner (MSM-EO) adds, "Three months prior to launch, we deliver the ESA "planned" timeline input to the Russian Planning Team (RPT). Then, about one month before, we deliver the "scheduled" timeline, which the RPT integrates into their Soyuz mission timeline, and ultimately into the daily ISS Short Term Plan timeline." EPT provides support in this integration process by periodically interfacing with the planners at Mission Control Centres in Moscow, Houston, and the Marshall Spaceflight Centre in Alabama, and by maintaining awareness of any issues that might impact the ESA timeline.

"There is not one crucial moment in the planning of a mission, but rather several important routine periods," says Warren Chell. "For example, we support the internal reviews of requested changes, as well as the daily Russian Re-planning Conferences, where desired changes are communicated to RPT about two days prior to execution day, for incorporation into their revised timeline products.

As a follow-up, EPT is responsible for checking that the Russian Form 24 accurately reflects all the latest requirements, and that it matches the Onboard Short Term Plan (OSTP). Form 24 is a chronological list of activities, with associated crewmembers that the ground mails to the crew each day. OSTP is an interactive, graphical timeline that is also uplinked each day for display via onboard laptops."

"In real-time, we worked while the crew was awake, covering two shifts per day from the planning console in the Dutch Investigation Science Room (DISR). For example, I worked the first shift from crew wake-up until midday, shortly after the daily Russian Re-planning Conference. I then handed over to Alessandro Buccini who worked until just before crew sleep. Assunta Sicilia and Warren Chell are support planners who assist myself and Alessandro, respectively, from the planning console in the Phase 1 Mission Support Room (PMSR)," says Giovanni Gravili.

>>>

The European Planning Team (EPT)
From left to right: Assunta Sicilia, Giovanni Gravili, Alessandro Buccini and Warren Chell

>>> behind the scenes of an ISS mission

A few hours before launch, André Kuipers and fellow crew member Gennady Padalka ask final questions about the Kubik biology facility.

Greta Bertuletti, Logistics Supervisor (MSM-EPI), ESTEC

When Greta Bertuletti was asked to provide the logistical support for the Delta mission, she thought it would be a tiresome task, but she soon realised just how challenging such an assignment could be. She mastered the whole operation with the assistance from a few colleagues, the ESA Moscow Office and the ESTEC Transport Office.

"Extensive forward planning is required for a mission to the ISS," she explains, "For the Delta mission, everything required for the biology experiments had be transported to Baikonur: chemicals, tools, spare parts. Unfortunately there are no shops on the launch site! Shipping lists had to be delivered weeks in advance to allow for translation and processing through the local authorities. Very often these lists were required a long time before the scientists had concluded their ground tests, which inevitably led to later alterations, causing irritation and complaints."

"To avoid long delays at the airport, we decided to carry the experiments on board as hand luggage. Airport security had to be informed well in advance of the contents to ensure that biological samples did not need to be opened or be subjected to X-rays. When everything seemed to meet with the security requirements of both the Russian and the Kazakh customs a new hurdle arose: the airlines refused to transport the cooling boxes

Greta Bertuletti, Logistics Supervisor

used to preserve the experiment samples. After the 9/11 terrorist attacks, airlines face very severe penalties if they are caught carrying items declared 'dangerous' and they prefer to lose out on a couple of plane tickets than deal with the proof that the International Air Transport Associations (IATA) regulations are met. Four days prior to launch, the decision was taken with the scientists to transport the cooling boxes in the cargo bay of the plane.

All's well that ends well! I would like to thank all the people in ESTEC, the ESA Moscow Office (EMO) and at RSC-E that provided support on the logistics' side of the Delta mission" says Greta Bertuletti.

Ulrich Straube, Crew Surgeon for the Delta mission," Crew Medical Support Office (MSM-AM)

"Health care is a critical aspect of an astronaut's career. The main task of Medical Operations (MSM-AM) at the European Astronauts Centre (EAC) is to ensure the health and well-being of European astronauts. They are therefore closely medically monitored at all times and even after finishing their active career, their health status continues to be checked," explains Ulrich Straube, Medical Doctor (MD) and Crew Surgeon for the Delta mission.

"Once an astronaut is certified "ready to fly," he/she will have undergone a series of medical tests to meet the international medical standards set by the Multilateral Space Medical Board (MSMB). Also, the back up astronaut must meet these same requirements in case he/she might have to take over as the prime astronaut. For the Delta mission, ESA astronaut Gerhard Thiele was the back up astronaut," adds Ulrich Straube.

"The crew surgeon's role in a mission to the ISS involves medical monitoring of the astronaut before, during and after the space flight. During the preflight period – when the astronaut is in training – I have to make sure he/she is medically "certified" in accordance with MSMB standards. Therefore, the astronaut's general health is thoroughly investigated. All areas of modern clinical medicine are considered as well as physical fitness and nutrition. "

"In addition to the standard certification described above, add-on procedures due to the use of a Russian launch vehicle will require special medical attention. Therefore, centrifuge runs, altitude chamber runs and vestibular training are closely monitored by the ESA surgeon. Also preparation for the so-called ballistic return in case of emergency requires special training and medical supervision. Medical Operations also contribute to the safe carrying out of life science experiments performed by the crew in accordance with the international standards applied at ESA."

"For the Delta mission, André Kuipers and myself were based at the Gagarin Cosmonauts Training Centre (GCTC) in Star City during the training period The launch campaign including quarantine was carried out in Baikonur, Kazakhstan. Immediately after launch, I took up my duties in the Mission Control Centre in Moscow. Here, I interacted first of all with the Russian Medical Group (GMO), the ESA Medical Group (MOST-CORD), the ESA Medical Counsel team in EAC in Cologne as well as with Mission Control Centre in Houston. All of these are governed by the Integrated Medical Group (IMG) headed by the lead flight surgeon in charge at the Johnson Spaceflight Centre (JSC)."

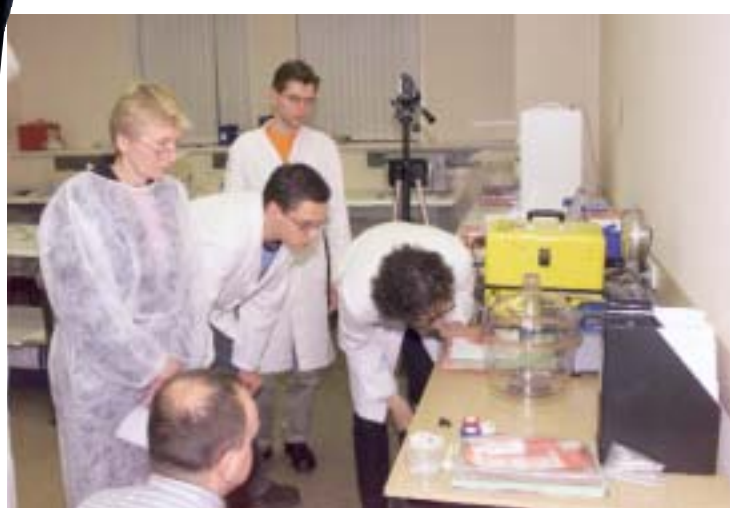
"Once the astronaut is in space, I closely watch for the physiological reactions that will take place in the new environment. During the first few days in space, astronauts may experience sickness, headaches, light-headedness but these symptoms usually subside relatively quickly. Private Medical Conferences (PMC) are held regularly via a voice link in which I can provide medical instructions when necessary. In an emergency situation instant medical advice can be provided and specific procedures will be executed. In space, special attention has to be paid to the consequences of microgravity. The work is more exhausting in comparison to training on Earth. The crew surgeon has to check that the astronaut is not overworked and that he/she is getting enough sleep. Objects in zero gravity float around if not fixed appropriately and could harm the astronaut. For long-term missions musculoskeletal deconditioning has to be counteracted by physical exercise."

Fit for space: Ulrich Straube with Dutch ESA Astronaut André Kuipers shortly before the launch. In between the two men: the Launch and Entry spacesuit which André Kuipers was trying on for size.

"As soon as the lander-orbiter touches down on Earth and the astronaut is pulled from the capsule, he receives a quick medical check-up. I make sure that he/she is able to stand or move around safely and he/she doesn't feel faint. In a special tent, the astronaut is taken out of his/her suit and a more detailed medical examination is performed, which covers firstly the cardiovascular system and neurological system.

The astronauts are then taken by helicopter and plane to the GCTC in Star City. There again, a thorough examination takes place including a variety of laboratory tests after blood draws. The post-flight and rehabilitation period lasts about two to three weeks after a short-term mission allowing the astronaut time to readjust to Earth's gravity."

Our special thanks to Pasquale di Palermo for his help and advice in the coordination of this article. ■



Final inspection of the hardware for the education experiment BugNRG, a study of the output of bacterial fuel cells in weightlessness, testing the assumption that the cells have a greater efficiency in space than on Earth. Data from this experiment is currently being processed.

Delta, great accomplishment for ESA's second flying Dutchman

André Kuipers shares his feelings after the mission:
"I did not want to leave the Station because there was still so much to see and experience. After the space flight, I felt very pleased that we had had a safe flight. The experience had been so good that I wanted to return to space! After 11 days in space, the physical readjustment back on Earth was difficult. When I moved my head my vision blurred and trying to go up the stairs required a special effort.

On the team, André Kuipers explains:
It was reassuring to know there was a large team on the ground ready to solve any problems we encountered. It was an advantage that I had worked as part of a ground team before, as I knew what was going on behind the scenes. I felt great support from them.

The most challenging moment?
From the moment I entered the Station, trying to perform all the experiments in a relatively short space of time was very challenging, to say the least.

The ESA Science flotilla

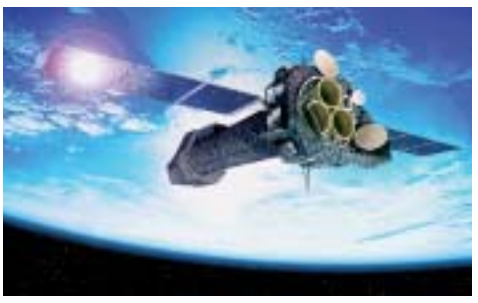
Update on ESA Science missions currently in operation

The most recent in a long series of science missions, Rosetta left Earth on 2 March 2004 to join the increasing number of ESA spacecraft which are pushing back the boundaries of space science. So how many ESA "flags" are out there, flying in space and exploring both our Solar System and the wider Universe beyond? The answer is an impressive 14 spacecraft, covering 11 missions. And that number is set to increase… Here's a reminder of the missions that make up ESA's flotilla. In the next issue of *ESA Today,* we will describe in more detail ESA's future science missions.

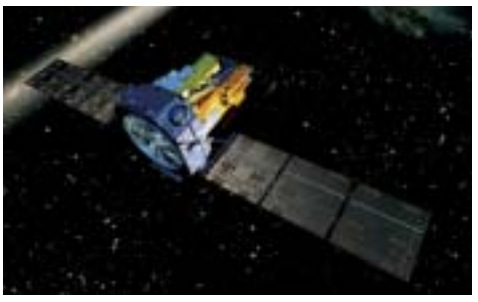
In the realm of astronomy

ESA is currently flying three astronomy missions: the first two are designed to study the violent high-energy universe with levels of precision never before achieved. They are XMM-Newton, an X-ray Multi-Mirror telescope launched in 1999, and INTEGRAL (International Gamma Ray Astrophysics Laboratory), a gamma ray observatory launched in 2002. The third requires little or no introduction. It is the Hubble Space Telescope (HST), a joint NASA/ESA project, operating in space since 1990.

XMM-Newton & INTEGRAL



XMM-Newton
Mission Manager: **Fred Jansen**, ESTEC
Project Scientist: **Norbert Schartel**, ESAC



INTEGRAL
Mission Manager: **Arvind Parmar**, ESTEC
Project Scientist: **Christoph Winkler**, ESTEC

After millennia of assuming that the heavens were static and unchanging, astronomers now know that they are a place of violent explosions and energetic processes, such as collapsing stars and black holes ripping neighbouring stars to pieces. Most of these extraordinary objects and events produce X-rays and gamma rays, the so-called "high-energy" radiation.

Since 2002, INTEGRAL has been providing scientists with data about these brief, but brilliant bursts produced about twice a day by random sources in the sky. The Spectrometer on INTEGRAL, SPI, has been particularly instrumental in capturing gamma rays from the Cygnus X-1 black hole, and from the Cygnus X-3 neutron star system, in an observation that took place on 21/22 November 2002. We are now aware that gamma rays do not originate from the black hole itself but are emitted by a swirling disc of ultra-hot gas that surrounds it directly.

During the spring and autumn of 2003, INTEGRAL observed the central regions of our galaxy, collecting some of the perpetual glow of diffuse low-energy gamma rays that bathe the entire galaxy. Thanks to its high sensitivity and pointing precision, INTEGRAL has shown that most of these gamma rays are produced by a hundred individual sources. A revolutionary discovery in high-energy astrophysics, as for more than thirty years, only a mysterious blurry fog of gamma rays had been observed.

"INTEGRAL is the only gamma-ray observatory presently in orbit whereas XMM-Newton is geared towards spectroscopy and that is where the real physics can be performed," says Sergio Volonte, Coordinator for Astronomy and Fundamental Physics Missions (SCI-CA). "Individually, XMM-Newton and INTEGRAL are superb spacecraft, that are often used together to study the same objects, thus providing a unique scientific tool."

The two satellites are used to map high-energy sources in the Galaxy and to help understand how stars are ripped apart by black holes, how massive stars in the early Universe die in the greatest explosions ever witnessed, how the chemical elements that make life possible have built up over the course of cosmic time.

Hubble Space Telescope

Project Scientist: **Peter Jakobsen**, ESTEC

Commonly attributed to NASA only, Hubble is actually a major European success too. The Hubble Space Telescope (HST) is the major near infrared-optical-ultraviolet telescope to operate from space. It has been one of the greatest space missions of all time. Its versatility as an observatory has meant that there is virtually no branch of astronomy that has not benefited from its observations. It has recorded the birthplaces of stars and planets in detail, monitored the weather on the planets in our Solar System, and seen back to times in cosmic history so remote that the light from those events has taken over 10,000 million years to reach Earth.

As a follow-on to this highly successful mission, a space telescope for the next generation is planned: the James Webb Space Telescope (JWST). ■

contact

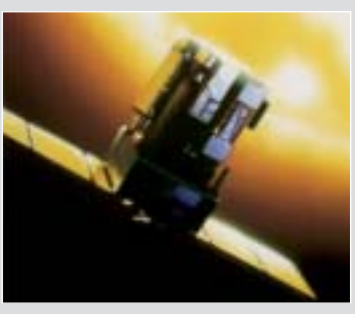
Sergio Volonte
Coordinator for Astronomy and Fundamental Physics Missions (SCI-CA)
Ext: 9 71 03 / 71 05
Fax: 9 72 36

1990

Hubble

Ulysses

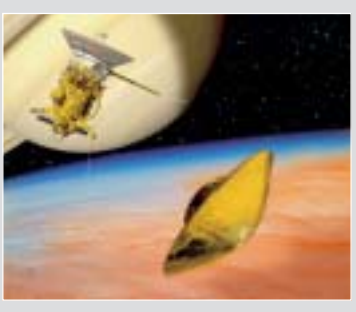
1995



SOHO

1997

Cassini-Huygens



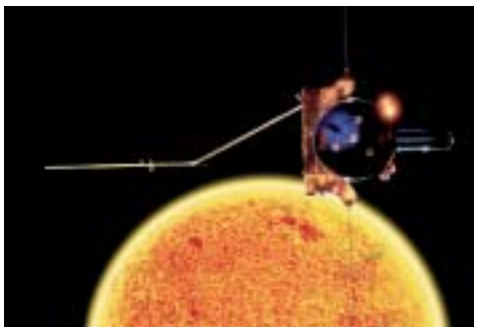
1999

XMM-Newton

In the Solar System

At present ESA is involved in a "bumper crop" of missions exploring the Solar System. No less than ten spacecraft are at various stages of their respective missions. "It all started with the Giotto mission to Comet Halley in 1986," says Marcello Coradini, Coordinator for Solar System Missions (SCI-CS). From that groundbreaking start, ESA has established a growing complement of missions that now encompasses the currently flying Mars Express, Huygens, SMART-1 and Rosetta.

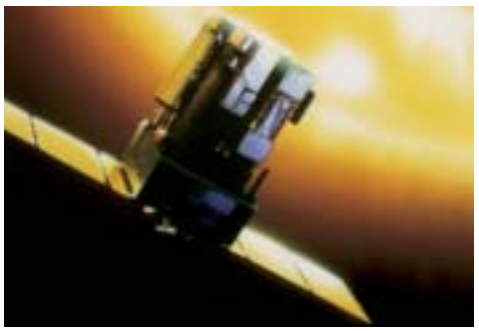
Ulysses



Mission Manager and Project Scientist: **Richard Marsden**, ESTEC

Launched in 1990, this ESA/NASA mission has, for the first time, sampled the environment of space near the poles of the Sun. To achieve this, Ulysses needed to first fly by Jupiter and use this giant planet's gravity to hurl it upwards and back towards the Sun. Ulysses has crossed both of the Sun's poles twice now and, in February this year, passed Jupiter for a second time, collecting data on how the Sun's activity affects this planet.

SOHO

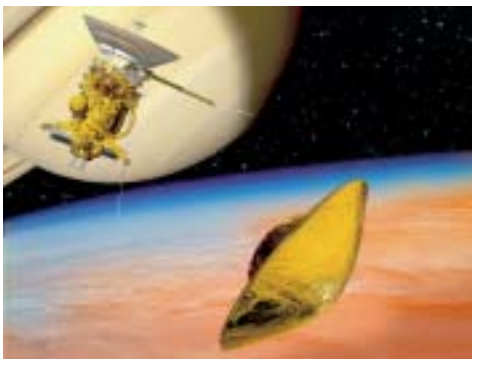


Project Scientist: **Bernhard Fleck**, Greenbelt

A special trio of missions, comprising six spacecraft, is dedicated to exploring the Sun and the nature of the Sun-Earth connection. Of these the ESA/NASA Solar and Heliospheric Observatory (SOHO), launched in 1995, is the solar watchdog, keeping an eye on the Sun and its extraordinary activity. The mission has recorded subtle oscillations of the solar surface that have allowed scientists to understand the interior structure of the Sun and to obtain a better understanding of the other stars in the Universe.

During October and November 2003, SOHO witnessed some of the largest solar storms on record. The electric and magnetic disturbances these events cause can be dangerous to spacecraft, high-flying aircraft and communications on Earth.

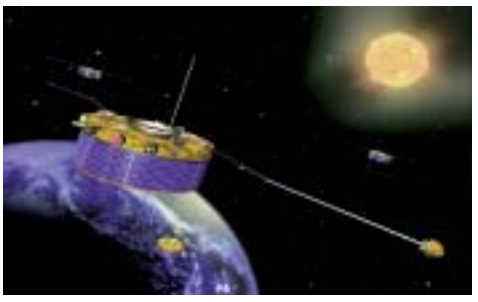
Cassini-Huygens



Mission Manager and Project Scientist: **Jean-Pierre Lebreton**, ESTEC

ESA's Huygens probe to Saturn's moon Titan will arrive at its final destination at the beginning of 2005, after an interplanetary cruise of nearly seven years. Launched in 1997 and hitching a ride on NASA's Cassini spacecraft, Huygens will be the first mission ever to land on a world in the outer Solar System. Titan is the only body in the Solar System with a nitrogen-rich atmosphere like the Earth, which contains many of the molecules that were on the Earth before life began on our planet. The conditions on this moon may therefore be able to give us clues about the Earth's chemical make-up before life began.

Cluster



Project Scientist: **Philippe Escoubet**, ESTEC

To understand more about the effects of the solar wind on our planet, ESA's Cluster mission was launched in two phases in summer 2000. As the name suggests, Cluster comprises a number of spacecraft, four in all, that fly in formation around the Earth. They sweep through the magnetic bubble that is generated in the Earth's core and surrounds the planet, recording its response to the solar activity. In 2003, Cluster made the first measurements of the electrical currents flowing around Earth and found they could reach a staggering one million amps.

Mars Express

Project Manager: **Rudolf Schmidt**, ESTEC
Project Scientist: **Agustin Chicarro**, ESTEC

This mission started its six-month journey to the Red Planet on 2 June 2003, and achieved its operational orbit around Mars last December. Since then, it has been providing enthralling data and images showing the direct detection of water, close-ups of the erosion patterns in the rocks, details of the dynamic atmosphere are all streaming back from Mars. The Mars Express spectrometer has also confirmed traces of methane in the atmosphere.

Mars Express was a major challenge for Europe mainly because it was "spun-out" of the Rosetta project relatively quickly and cheaply. A new mission, Venus Express, will follow this same pattern.

SMART-1

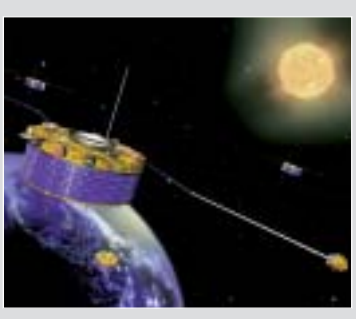
Project Manager: **Giuseppe Racca**, ESTEC
Project Scientist: **Bernard Foing**, ESTEC

Launched on 26 September 2003, SMART-1 is an experimental mission that is not only testing the sophisticated technology of solar electric propulsion, to make ESA's next batch of Solar System missions more efficient, but is also going to produce new science when it arrives at the Moon later this year. It will search for evidence to support the theory that the Moon was formed out of the collision of Earth with another planet, over 4,000 million years ago.

>>>

2000

Cluster



2002

INTEGRAL

2003

Mars Express

SMART-1

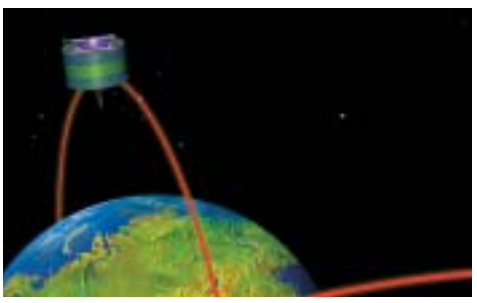
Double Star TC-1

2004

Rosetta

>>> the esa science flotilla

Double Star



Project Manager: **Bodo Gramkow**, ESTEC
Project Scientist: **Philippe Escoubet**, ESTEC

In Cluster's footprints is Double Star, a joint mission between ESA and the Chinese National Space Administration (CNSA). This is a two-satellite mission, the first of which was launched in December 2003, to be followed by a second launch in July 2004. Double Star will study the Earth's magnetic field, complementing Cluster and enhancing the scientific return of both missions.

Rosetta

Project Manager: **John Ellwood**, ESTEC
Project Scientist: **Gerhard Schwehm**, ESTEC

Earlier this year, on 2 March, Rosetta was launched to follow up and greatly extend the science begun by Giotto, almost twenty years ago. Reaching Comet Churyumov-Gerasimenko in 2014, Rosetta will also fly by the asteroids Steins and Lutetia and, once the final target is reached, make the most detailed study of a comet yet. Results from the orbiter and the Philae lander will provide us with a wealth of information about comets and may also be crucial to the story of life's origin as comets may have delivered the raw chemical ingredients of life to planets. Such investigation fits in perfectly with the goals of the Solar System Exploration programme. ■

contact

Marcello Coradini
Coordinator, Solar System Missions (SCI-CS)
Ext: 9 75 55 / 71 05
Fax: 9 72 36

Exploiting scientific potential

The ESA staff member responsible for seeing that all missions are exploited to their full scientific potential is Alvaro Gimenez, Head of the Research and Scientific Support Department (SCI-S). "It is very exciting with all these missions flying. It is obviously a difficult job to run all of them at the same time but I'm certainly not going to tell you I want less missions. In fact, I want more!" says Alvaro Gimenez.

And he looks certain to get them. It is essential that progress be made in all fields of space science. It is ESA's commitment to provide a variety of space missions that allows this to happen. Ideas are therefore proposed by the scientific community and studied under the coordination of Sergio Volonte and Marcello Coradini.

Sergio Volonte says, "One of the most exciting aspects of my job is interacting with scientists in the academic community. Because our funds are limited, we have to be very selective about which missions are chosen to fly. So we choose the ones that will have a unique scientific impact." Marcello Coradini agrees, "We have to interpret the best ideas from the scientific community and translate them into missions."

The brightest ideas are first studied internally and then, if everything seems to fit, industrial partners are brought on board with an appropriate science team. After this definition phase, the mission is hopefully given the "go ahead" by ESA's various advisory groups and committees. ■

contact

Alvaro Gimenez
Head of the Research and Scientific Support Department (SCI-S)
Ext: 5 35 52 / 35 53
Fax: 5 46 99

Future Missions

Once a mission is approved, it is handed over to Jacques Louet, Head of the Scientific Projects Department, to build the spacecraft and launch it. He says, "I am like the orchestra's maestro, conducting the musicians." His musicians are the project managers and their teams, assigned to each mission.

Jacques Louet's current symphony is composed of future missions, at different levels of implementation, all due for launch before 2014: Venus Express (2005), the CNES/ESA Corot mission (2006), Herschel (2007), Planck (2007), LISA Pathfinder (2007/2008), the James Webb Space Telescope (2011), Gaia (2012), Bepi-Colombo (2012), the LISA mission (2012), and Solar Orbiter (2014). This part of ESA's Science Programme will be developed further in the next issue but here we give you a foretaste.

Astronomy and Fundamental Physics

Corot will be the first space planet finder. Herschel will be the biggest space telescope ever launched. With its 3.5-metre mirror, it will extend astronomy's reach into the realms of star and galaxy formation. By collecting the "echo" of the Big Bang, Planck will unlock fundamental secrets about how the Universe formed.

The Laser Interferometer Space Antenna (LISA) is a joint project with NASA that will be preceded by a technology precursor, LISA Pathfinder. Together, they will be the first fundamental physics missions ESA has flown. LISA will test Einstein's general relativity by detecting gravitational waves, minuscule waves that flow through space like ripples across a pond. Gaia will make a census of the galaxy, finding stars, asteroids, planets and many other celestial objects, altogether over one thousand million.

There is also ESA's significant contribution to the James Webb Space Telescope (JWST), the successor of Hubble (HST). ESA will supply half the payload, the launch (on an Ariane 5) and participate in the science operations.

Solar System

Venus Express, Bepi-Colombo and Solar Orbiter will help us continue the exploration of the Solar System. Venus Express will visit the Sun's second planet to understand its hostile, poisonous environment including its dramatic greenhouse effect. Bepi-Colombo will map Mercury and its environment and try to understand how a planet so close to the Sun could form and evolve. In 2010, Solar Orbiter will travel closer to the Sun than any satellite before and explore the Polar Regions and other areas that are not visible from the Earth.

In the longer term

Beyond 2015, there is a virtually clean slate, but ESA's brains never stop thinking about a future up to and beyond the current level. "We have no defined programme yet for the longer term, 2015 to 2025," says Sergio Volonte, "We have two studies: Darwin which aims to find Earth-like worlds around other stars, and Xeus which aims to create the next generation of X-ray observatories. We have just begun to develop our overall scientific themes for this timeframe by consulting with the scientific community and we aim to have more precise ideas in place by the next Ministerial Council Meeting in 2005."

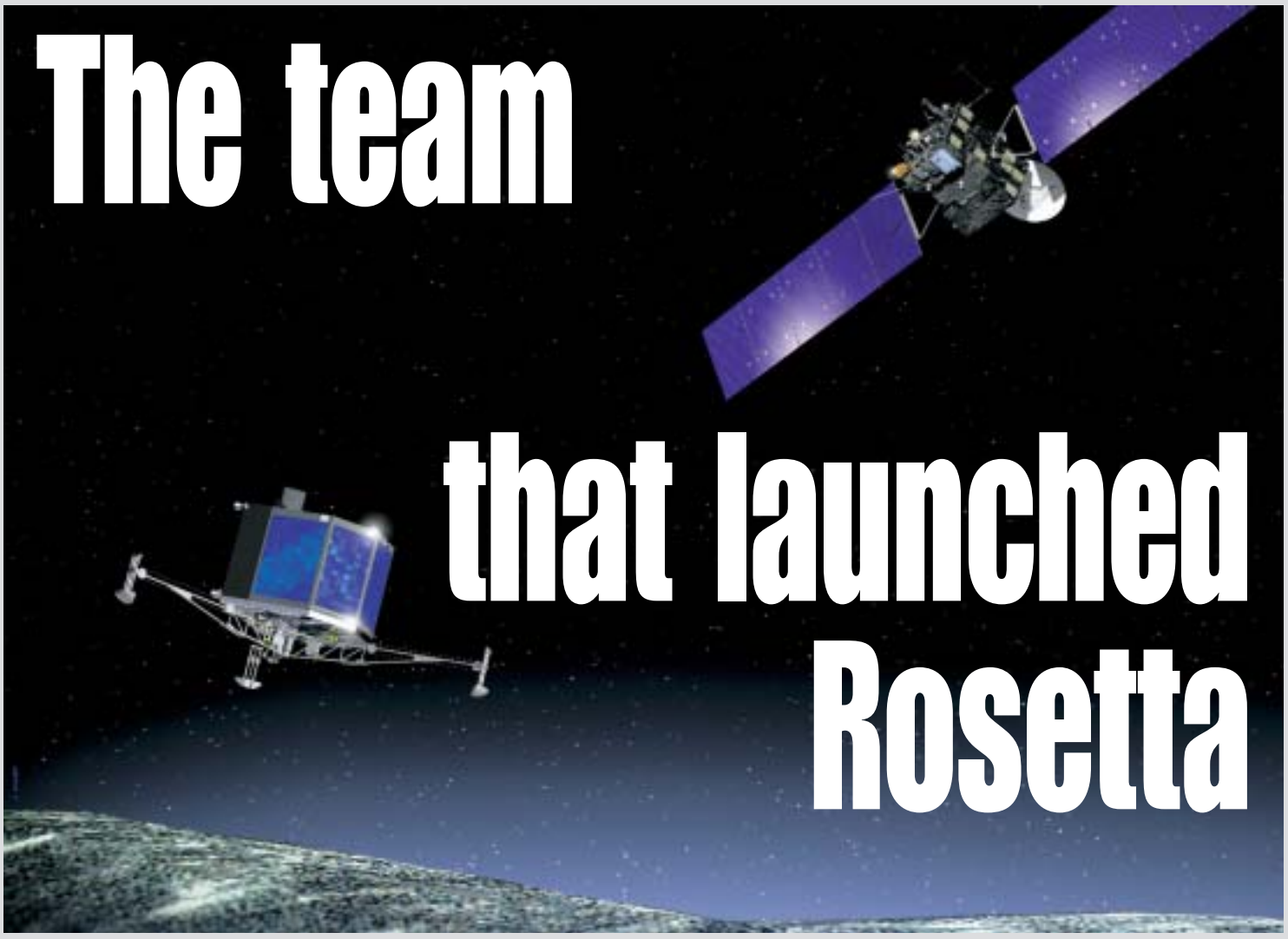
Jacques Louet is clear about his hopes for the programme, "We have real spacecraft and have made real progress. I hope that public support for our programme will build as the results become known and then, hopefully there will be the political will to boost our programme and maintain its momentum."

David Southwood, Director of the Science Programme (D/SCI), must maintain the Science Programme's thrust and shape, "Europe should be proud of its space science programme, of its achievements and of its promises for the future. The wealth of individual and institutional tenacity and expertise allows us to punch above our weight in the world arena. With the support of the Member States, it is our duty to work and extend this programme to further our research and reap the benefits such knowledge and technology bring." ■

contact

Jacques Louet
Head of the Scientific Projects Department (SCI-P)
Ext: 5 44 55 / 36 24
Fax: 5 60 48

The team that launched Rosetta



Over 2,000 people participated in the Rosetta mission

All was dark and still in the pre-dawn sky over Kourou, French Guiana. Then, at 04:17 on 2 March 2004, the brilliant white plume of an Ariane 5 rocket lit up the night and roaring noise shattered the silence. Rosetta was on its way, taking its first steps on an extraordinary odyssey across billions of kilometres of space and back through 4,600 million years of cosmic history, to the origin of our Solar System…

In 2014, when Rosetta and its lander Philae arrive at Comet 67P/Churyumov-Gerasimenko, they will be visiting a piece of living history. Comets are the leftovers of planetary formation and contain an extraordinary complement of chemicals necessary for life. As such, Churyumov-Gerasimenko may be the 'Rosetta stone' needed to understand the origin of life on our world. On the way Rosetta will also fly by at close quarters two asteroids, Steins and Lutetia, which are also carrying important information about the origin of our Solar System.

If launching Rosetta is thought of as a football match, then 2 March 2003 was the end of an extraordinary year-long 'extra time.' In January 2003, Rosetta was postponed due to necessary checks on the Ariane 5 launcher and the mission missed the opportunity to fly to its original target, comet Wirtanen. The mission's Project Scientist Gerhard Schwehm says, "At the time it was a real disappointment but we were all confident that another target would be found because, years ago, we had compiled a list of target comets from which we chose the original mission. By March last year we knew that going to Churyumov-Gerasimenko was feasible."

Nevertheless, it was a testing time for all concerned. A year-long launch postponement when your spacecraft is virtually on the launch pad is something of an odd scenario. "Our biggest technical challenge was that the oxidiser (which allows the fuel to burn) could not be taken out of the spacecraft," says Gerhard Schwehm.

Gerhard Schwehm, Rosetta Project Scientist

John Ellwood, the Project Manager, continues, "We drained the fuel, which is the explosive part, but we knew that to take out the oxidiser could cause the titanium tanks to crack." Instead, his team babysat the full spacecraft, removing the solar panels and high-gain antenna for separate storage. At various stages during the year, they also gave the spacecraft some physiotherapy. "We exercised all the moving components at regular intervals to make sure all the mechanisms were properly lubricated," he says.

The people who built Rosetta

It all required close coordination between the various teams responsible for Rosetta, such as the scientists under Gerhard Schwehm, John Ellwood's project team, the industrial contractors, and the science teams around Europe who built the instruments. Gerhard Schwehm is quick to point out just how good the teamwork was, "Everyone involved worked extremely well together. Both industry and the project team responded very professionally. And we have had really excellent help from our colleagues at the European Southern Observatory (ESO), helping us learn more about Churyumov-Gerasimenko. Everyone just got on with the work that needed doing."

John Ellwood adds, "Teamwork has been essential all the way through the Rosetta programme. We estimate over 2,000 people across Europe contributed to this mission. During the last year, a number of them who had moved on to other projects made the time to come back and work on Rosetta again."

John Ellwood, Rosetta Project Manager

In the case of the science teams, many saw it as a good opportunity to fine-tune their instruments. Such tasks began in the summer 2003, with most scientists travelling to Kourou to perform their refurbishment on site. Only one instrument needed to be temporarily returned to Europe.

Because comet Churyumov-Gerasimenko is about three times larger than the original comet, the landing of Philae had to be re-examined. >>>

>>> the team that launched Rosetta

The Rosetta scientists and engineers at Kourou

"We ran simulations and tests that showed the spacecraft could topple over if the comet was very dense. So we designed and fitted a small modification, designed to prevent the lander toppling," says John Ellwood.

Rosetta satellite being inspected at Kourou, as part of the activities during the 2nd launch campaign, November 2003

By the end of October 2003, the launch campaign began again. "By Christmas the spacecraft was ready and we were all very confident, our colleagues from Launchers were all doing such an excellent job that we were sure everyone had done everything possible to ensure success," says Gerhard Schwehm. So everybody was a bit nervous when the first two launch possibilities, on 26 and 27 February 2004, were postponed. "To tell the truth, I think the tension did go up a little bit, but we all remained very confident".

Tension lifted on 2 March, when everything went smoothly and Rosetta was lofted into space. "The high accuracy of the orbit insertion also allowed us, once the fuel available for the mission was assessed, to select two excellent asteroids to target for fly-bys. This is an incredibly good spin-off from this launch," adds Gerhard Schwehm. "We have now tested the spacecraft and have completed the first stage of instrument commissioning. We are pleased to say all the instruments are working properly. So far, the spacecraft is working like a dream," says John Ellwood.

Rosetta being fuelled in Kourou, February 2004

After the successful launch of Rosetta, from left to right: Gerard Melchior, in charge of launch vehicle interfaces (ESA), Jacques Louet, Head of the Scientific Projects Department (ESA), David Southwood, Director of the Science Programme (ESA), John Ellwood, Rosetta Project Manager (ESA), Claude Berner, Payload and Assembly Integration and Verification manager (ESA), Gerhard Schwehm, Rosetta Project Scientist (ESA), Philippe Kletzkine, Rosetta Lander Manager (ESA), Rainer Best, Astrium Rosetta Industrial Project Manager (Astrium GmbH), Paolo Musi, Project Manager of Industial Assembly Integration and Verification team (Alenia)

"When the instrument commissioning will be completed, the mission will be handed over to the science team. "I must now try to grasp that this mission is in orbit and real. It is slowly going into my brain that the everyday work begins for us now," says Gerhard Schwehm, "and I have to say, it is really satisfying." ■

A boost of confidence for Europe

Rosetta may be a science mission but it represents a wide and successful collaboration throughout all of ESA and beyond. "The success of Rosetta involves not just the Directorate of the Science Programme (D/SCI) but everyone at ESA and European industry but also the institutes that supported us," says Professor David Southwood, Director of the Science Programme, "This is a demonstration of European skill and capability that represents much more than just the world-leading science Rosetta will perform."

Of particular importance was the perfect launch injection achieved by the Ariane team. For Rosetta it means the ability to visit two asteroids en route to Churyumov-Gerasimenko. For ESA in general, it boosts confidence for the next deep space missions relying on Ariane 5: Herschel, the James Webb Telescope (JWST) and Planck. Herschel will search for the origin of stars and planets, the JWST will search for the origin of galaxies and Planck will search for the origin of the Universe itself.

All three missions must be placed in a special 'sweet-spot' in deep space, about 1.5 million kilometres beyond Earth's orbit. The launch of Rosetta proves that Ariane 5 is the launcher to put them there. "It all bodes very well indeed," says David Southwood. ■

Seeing the bigger picture

ESA's Basic Orientation Programme, (not only) for newcomers

A 90-minute orientation programme in the form of an e-application is being introduced at ESA. It provides the learner with a high-level perspective on the Agency's activities, structure and governance, procurement and financial systems, as well as programme management activities. While developed initially for newcomers as a mandatory introduction to the Agency, this programme is for all ESA staff, who are encouraged to use it as a handy reference to the Agency's overall purpose and functioning.

A reinforced corporate spirit

Director General Jean-Jacques Dordain, in Agenda 2007, calls for the support of staff in his tasks and purpose, underlining the importance of adhering to the objectives of the four-year plan and contributing to its actions. The need for a reinforced corporate spirit at ESA emerges as particularly strong. This requires a common understanding of ESA's purpose, history and challenges.

Having a global vision of the range of highly specialised activities at ESA is not usually the natural preserve of any one person. However, as we are engaged today in many collaborative activities, it is increasingly important for each of us, as staff members, to be able to explain our basic activities in simple terms. The overall perspective of what ESA stands for also helps each of us to better understand the purpose and contribution of our own functions, both within our everyday context and as part of the bigger picture, enhancing performance in our individual work and the way we work together as the European Space Agency.

Improving our organisational effectiveness

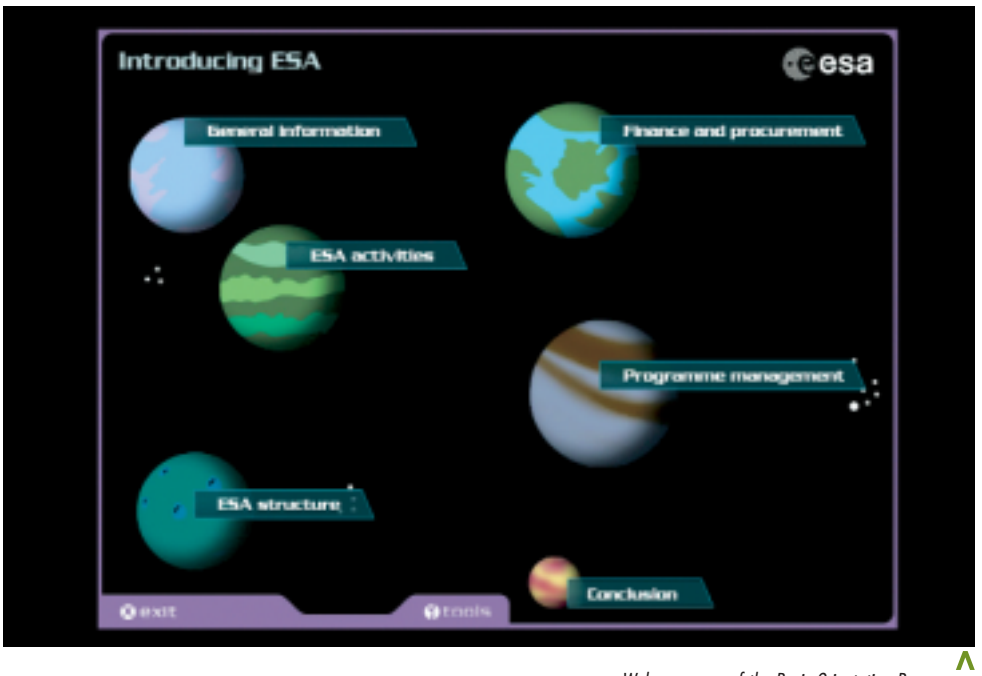
Creating an appropriate orientation tool was not only a matter of making information available to ESA staff. "Collecting the information was a lesson in itself," explains Véronique Percheron, the project manager of the Basic Orientation Programme. "It very quickly emerged that practices across ESA were not standard. We encountered instead local norms and found that in spite (or because) of their own in-depth knowledge, colleagues were not necessarily even aware of other colleagues' way of doing things. This discovery in itself is a first step towards harmonising our own practices, sharing best practices, and providing a reference tool designed to improve our organisational effectiveness."

Tribute to Erik Slachmuylders

"The team would particularly like to pay tribute to Erik Slachmuylders who worked with us on this project following his retirement from ESA two years ago until very sadly he died last year. We are sure that his loss is felt on a personal and professional level by all colleagues at ESA who had the privilege of knowing him."

The consultative process

The consultative process involved in collecting information was key. Véronique Percheron says, "We had over 30 contributors, each providing in-depth knowledge in their own fields. Their willingness to contribute, I think, reflects the value they saw in what we were trying to achieve. We are grateful for their cooperation as the majority of information we collected had not been written down and sometimes pertained to the expertise of just one person. The most important contributors now are the staff themselves and the proof of the programme's success will be the benefits they derive from using it."



Welcome page of the Basic Orientation Programme

Learning about ESA for all

The Basic Orientation Programme is relevant to all staff, at whatever age or grade, whether to refresh your memory or learn something new. Véronique Percheron says: "I myself have been at the Agency for almost 20 years, but have to say that I learnt a lot about the Agency from this project. Thankfully, we can always learn and, since in a healthy work environment things also change, there is always more to learn."

Why e-learning

Our online host allows us to bring together far more information in one place than it would be possible to transmit through traditional training methods, and meanwhile takes up no space. Meeting the challenge of the geographical dispersion and mobility of our staff, it requires neither the contributors nor the users to move physically. It can be updated easily and so is efficient in keeping abreast of new developments and remains pertinent for staff at all times and whenever new staff join. Overall, the e-application provides a more flexible and convenient way of learning.

Easy to use

The application is made up of just five modules, each divided into sub-sections. The architecture is simple, making the site easy to navigate. Parts of the site are interactive allowing users to test their knowledge through question and answer sessions. There are no flashing icons or secret passwords, and it takes 90 minutes to explore the entire application. In any case, staff will shortly be invited to give their feedback so that suggestions to enhance the programme can be incorporated while it is in its pilot phase.

The whole is greater than the sum of the parts

The "product" is a living entity in which each section feeds the others, providing insight into practices across the Agency and inviting staff to learn from and about each other. Staff, therefore, have a proactive role to play as both users and contributors. We hope that in our everyday working lives, it will be an efficient tool that will allow us to retrieve information quickly and pass it on in a coherent and transparent way that reflects our way of working at the Agency. ■

contact

Véronique Percheron
Corporate Training
and Development
(RES-HMR), HQ
Ext: 9 73 60 / 9 74 23
Fax: 9 76 59

Know thyself

The Self-Assessment Tool

In a drive to update the tools for staff self-improvement, the Human Resources Department (RES-H) has developed a new tool. Here's how it works and how it can work for you.

In his objectives for the Agency over the next four years, Director General Jean-Jacques Dordain has stressed the importance of transversal activities. Cooperation and collaboration, both within and between teams, are fundamental to achieving the goals outlined in Agenda 2007. Effective communication is one of these goals. Talking openly, giving and receiving feedback, even agreeing to disagree, and giving our opinion in an environment of trust and mutual respect, are prerequisites for successful cooperation and collaboration. Effective communication relies on sharing a common professional language that we all understand and relate to. In a work environment as multilingual and multicultural as ours, this is a challenge.

Why a self-assessment tool for ESA?

One of the many objectives of the Human Resources Department (RES-H) over the last few years has been to provide a range of services, tools and information to support improvement in staff competency. The Generic Competency Model described some of the behaviours considered effective in the ESA context. Using this model as a basis, two tools – the Competency Based Recruitment and Interview Tool and the Competency Based Tool for Setting and Assessing Behavioural Objectives – have been made available as a support when jointly defining desired behaviours through an interview, and to help establish related skills development objectives. The Self-Assessment Tool is a third such tool and was made available in January 2004 following a pilot test in Autumn 2003.

Far from being an end in itself, self-assessment, together with feedback from others, should lead to greater self-awareness and increased mutual understanding. Self-assessment is particularly useful when preparing a job application or for the Annual Assessment Exercise, as well as exploring career options and opportunities.

What about confidentiality?

The Human Resources Department will know who has requested the tool and who has been granted access. Beyond this, no-one in RES-H has access to the information submitted in the exercise either by the staff member or those asked to provide feedback. This information is stored on a server belonging to an external service provider. Only when three or more persons have provided feedback will the data be merged and the result provided to the staff member, thus guaranteeing the confidentiality

Self-Assessment testimonials

Among the staff members who have either participated in the pilot test, or used the Self-Assessment tool, the following volunteered their feedback:

"As part of the "Learning and Development Programme"(LDP) in which I took part in Brussels last year, we put the Self-Assessment Tool to the test. Otherwise known as the 360-degree assessment, its purpose is to compare the way colleagues see you to the way you see yourself. Using a list of questions linked to the ESA Generic Competency Model, you first assess yourself and then ask colleagues working with and for you, within and outside ESA, what they think about you, all of this being confidential.
I found the experience very interesting. The insight I gained even made me decide to change the way I work with some of my colleagues. I believe that self-assessment in this way is very important, especially in project teams where working relations are very close. It can help achieve greater harmony. The down side is that getting feedback from colleagues can take time. I chose to approach six colleagues but I think the result was well worth it. There were a few teething problems with the tool, but these were fixed as a result of our pilot test."

Giuseppe Reibaldi
Head of MFC Division* (MSM-GF), ESTEC
Microgravity Facilities for Columbus and External Payloads Activities Division

"I work in the Information Systems Department (OPS-I), coordinating functional support for financial applications. Although I have no hierarchical managerial position, I manage a team of on-site contractors on a functional axis. I interface with many different actors at the Agency, such as functional support team members, end-users, user groups, project teams and colleagues in functional support. Until now, the only feedback I'd had was that of my hierarchy through the Annual Assessment Exercise. But I had no feedback from the people interacting with me on a daily basis. This is why I was particularly interested in the 360-degree assessment tool. This tool enables you to ask for feedback from any relevant actor within or outside ESA. The feedback is of course anonymous: one does not know who has said what and that is not the purpose of the exercise. Using a set of questions based on the Behavioural Competency Model developed by RES-H (Relations, Cognition, Corporate Identity and Actions), the tool identifies the gap between your own assessment of yourself and the way others assess you. I found this really valuable for one's self-development. I personally think this tool is very useful for anyone involved in management, at no matter what level, or anyone interacting frequently with others."

Janine Bennecib
Process/Applications Support Engineer (OPS-IF), HQ

"I did not participate in the pilot testing of this tool but became curious when it was officially announced by HR, and then discussed by staff representation, so I requested a username from our HR Advisor in order to form my own opinion – and at the same time get an assessment of myself. The tool is easy to use and to configure, and the time required by the individual to complete the exercise can take anywhere from 20 minutes.
Some of the questions relate easily to the daily work environment, others less so and consequently the feedback may vary from question to question. Having written comments is very useful because this allows the people involved to be very specific in

< *Matteo Della Grazia, responsible for the development of the Self-Assessment tool and Véronique Percheron in charge of its implementation*

of individual responses. RES-H will however be able to track overall user activity. The HR Advisors are on hand to provide any help you may require during the exercise or subsequently advise on how to follow up. While no training is required for staff to use the tool, HR Advisors have all been trained to assist you in the interpretation of results, if you choose to provide them with a copy.

The success of the Self-Assessment Tool will be largely judged on the level of interest from staff and how valuable and useful you consider its outputs.

Feedback so far

Since the introduction of the Self-Assessment Tool on 19 January 2004, a large number of staff have consulted information on this subject on Human Space-HR Online, with over 150 in the two days following the announcement.

The 15 staff members involved in the initial pilot test carried out in late 2003 reported that they enjoyed the exercise. It was particularly encouraging to see that, from the very start of the pilot test, some of the subjects asked as many as nine others to evaluate them – peers, bosses, their own staff and even outside clients. This 360-degree assessment is in fact optional in the actual exercise. The openness to self-assessment is in itself a step forward, but the readiness to seek 360-degree assessment really shows progress in the way the culture of our workplace is evolving. Beyond the pilot test, numerous staff members have been given access to the tool and have used it.

How do I obtain access to the self-assessment tool?

If you are interested in obtaining access to the Self-Assessment Tool, please contact your Human Resources Advisor. He/she will make the necessary arrangements within the available system capacity. ■

contact

Véronique Percheron
Corporate Training and Development (RES-HMR), HQ
Ext: 9 73 60 / 9 74 23
Fax: 9 76 59

More about the Self-Assessment Tool

Matteo Della Grazia, who has since left the Agency, led the development of the Self-Assessment Tool. He explains, "Its purpose is to encourage and enable all staff to take an active role in developing their personal skills and take responsibility for managing their own career."

Acquiring such insight will empower users to better assess their current impact and potential at work. The Self-Assessment Tool is an opportunity to test competencies in a safe environment: feedback is confidential and without direct bearing on staff members' career situation, allowing them to get better acquainted with their strengths and weaknesses and confront these in an objective way. It is designed to help staff make sound career decisions based on a comparison between their own profile and job requirements; to reassess their career direction and also plan constructively and systematically how to acquire the necessary competencies.

Self-Assessment testimonials

their feedback and make comments that would never surface in the Annual Assessment. It is in fact a good complement to the Annual Assessment Exercise because it provides feedback not only from your hierarchical superiors, but also from peers and people outside ESA. However, in some cases a person might not be able to judge a particular behaviour or skill. One suggestion would be to provide a "no opinion" option, where currently those asked for feedback must answer every question.
Almost two months after having initiated the process, I am still waiting for feedback from some of my colleagues, so maybe fewer questions on my side would have been better. Results returned so far for me have been very interesting. There were discrepancies between my assessment of myself and the opinion of my peers in some areas. Whether positive or negative, these provide very useful input for future improvement."

Jürgen Scholz
Information Systems Engineer
in the Information Systems Department (OPS-I), ESRIN

"Selecting competencies on which to base your self-assessment in itself helps get a grasp of the competencies valued by ESA and how these translate into our daily tasks. It also helps to focus on what is most important in our current role and could be useful for a possible career move.
Following up the initial, critical evaluation of oneself with feedback on how others perceive you (which may be completely different – I have yet to find out!) lets you know where your strengths are and where you can improve. The tool provides pointers on how to go about this and will also show you where opportunities might lie. The rest is up to you.
In order to get an all round view, I chose to be evaluated by my supervisor, colleagues from my Division who depend on my work getting done, colleagues who perform similar tasks to myself and those with whom I interact on a daily basis."
I think this is an important tool for everybody at the Agency, regardless of grade or goals. It can help us get to know ourselves, better understand what ESA expects of us and how well we are living up to this in the eyes of others. With the help of HR Advisors, I think it will also be beneficial to anybody looking for promotion or a career move, as it spells out very clearly the assessment criteria and the behaviour you need to achieve."

Cecilia Nilsson
Assistant Administrator (OPS-ST), ESTEC

"I found this a very useful tool, especially for someone like myself who aspires to having greater managerial responsibilities, and especially if you avail yourself of the opportunity of being assessed by others. The results are presented in a very clear way using axes to show the divergence between the way we have assessed ourselves and the way others assess us. This provides very useful pointers for what we have to work on.
Quite often, we can get a surprise as we do not necessarily see ourselves in the same way as others see us. We tend to be harder on ourselves than others might be, I hope so anyway! So the results can be encouraging and, in any case, free us to work on the areas that actually need attention. My only criticism would be that some of the questions are not altogether clear and so could yield results that are not really reliable. But this can easily be ironed out at this early stage."

Isabelle Duvaux-Béchon
Administrator in the Education Office (EXR-E), HQ

A day of sporting gestures

ESA Awards Programme celebrates its third successful year

It was cold outside, but the reception held after the EAP prize-giving ceremony at ESRIN was far from frosty as around 150 staff gathered to congratulate "colleagues nominated by colleagues," rewarded for their achievements through this most personal distinction offered by the Agency via its staff representation. Learn about EAP 2003 and prepare for the 2004 campaign.

Just getting to ESRIN for the EAP celebration in January 2004 was an achievement in itself. Guests battled to make the journey as bad weather conditions played havoc with travel arrangements. Fortunately, Daniel Sacotte, at that time Director of Administration, now Director of Exploration (DG-E), was able to stand in at a moment's notice to present the awards on behalf of Director General Jean-Jacques Dordain who remained stranded "somewhere between Paris and Amsterdam". Gaele Winters, the former Director of Technical and Operational Support (D/TOS), now Director of Operations (D/OPS), José Achache, Director of Earth Observation Programmes (D/EOP), and Johnny Butu, Head of the Planning and Project Control Office (EOP-FC) who has organised the programme for the last three years, took part in the ceremony, with Bryan Melton, Chairman of the Central Staff Associated Committee (CSAC), as "Master of Ceremonies". To complete a morning filled with good humour, Jean-Jacques Dordain arrived in time to congratulate each winner individually at the celebratory lunch.

EAP 2003

In a world governed by budget limitations, it is invigorating to see the success of projects driven by hard work and dedication. The number of good proposals - over 130 nominations this year - made the choice of winners a difficult decision, and according to Bryan Melton, "a problem we can only hope will continue, as more and more staff join in the exercise." He also pointed out the progress made in terms of gender equality, as this year saw a number of "winning women" on the teams. In response to the high quality of the projects, the Administration agreed for the second year running to fund an extra prize, making two team prizes and three individual prizes.

EAP Selection criteria

- Originality
- Demonstrated dedication
- Effectiveness
- Potential for application in other areas of ESA's work
- Relevance to ESA

Where it all began

Bryan Melton, Chairman of the Central Staff Association Committee (CSAC) explains the concept: *"With the kind of work we are involved in at ESA, we see staff who are dedicated, not to say passionate, about what they do. What better way to show our recognition than through the esteem in which we hold each other. Indeed, who can better see the value of our work than our colleagues who see us in action every day?*

"We wanted to create an opportunity for staff to pay tribute to their peers, and in this way EAP is unique, acting as a complement to ESA's other forms of merit recognition, such as promotion, premiums or bonuses based on recommendations that the Department of Human Resources (RES-H) receives from managers. The initiative was welcomed by the Administration, now the Directorate of Resources Management (D/RES) which funds the programme, while it is organised by the CSAC."

2003 WINNERS

Andrea Baldi
Infrastructure System Engineer (OPS-ITS), ESRIN
For his leadership of the Enhanced Mobile Computing (EMCO) Project: The project has resulted in a state of the art Wireless LAN (Local Area Network) being made available in most ESA conference rooms, making it possible to connect to the LAN without using cables from more than 60 conference rooms at ESA sites. The ESACOM Wireless Local Area Network (ESACOM WLAN) is part of the ESACOM Mobility Package.

Daniel Lamarre
Gradiometer Instrument Engineer (EOP-PGM), ESTEC
For his new approach for the Gradiometer Calibration of the Gravity Field and Steady-State Ocean Circulation Explorer (GOCE) mission, which will measure high-accuracy gravity gradients and provide global models of the Earth's gravity field and of the geoid (the surface of equal gravitational potential of a hypothetical ocean at rest).

Stephane Roure
Laboratory Technician (TEC-MCV)
For his achievements in Thermal and Mechanical Testing at the Mechanical Systems Laboratory.

The Mars Express Flight Dynamics Team
ESOC
For the first worldwide mission combining a lander and an orbiter.
Team members:
Jürgen Fertig, Overall management and coordination; **Vicente Companys Ferran**, Command generation and Mars Express Flight Dynamics Manager; **Mathias Lauer**, Monitoring of the avionics system, calibration and generation of auxiliary data for scientists; **Trevor Morley**, Trajectory determination; **Johannes Schoemaekers**, Manoeuvre optimisation; **Rüdiger Cramm**, Test and validation orbit, and **Susanne Kasten Coors**, Test and validation attitude.

The ENVISAT Payload Data Segment Team
ESRIN
Team members: **Veronique Amans**, **Vincenzo Beruti**, **Roberto Biasutti**, **Olivier Colin**, **Alessandra Buongiorno**, **Eric Doyle**, **Pierre Femenias**, **Antonio Flati**, **María Eugenia Forcada Arregui**, **Rob Koopman**, **Pascal Lecomte**, **Rosemarie Leone**, **María Longo**, **Sergio Marra**, **Jolyon Martin**, **Eric Monjoux**, **Philippe Mougnaud**, **Mats Onnestam**, **Gian Maria Pinna**, **Pierre Potin**, **Betlem Rosich**, **Sergio Bazzana**, **Norrie Wright**, **Pascal Gilles**, **Philippe Goryl**, **Nigel Houghton**, and **Simon Jutz**.

Winning remarks

Bruno Greco: *"I am grateful for this award and would just like to say that it is very important to pursue your ideas, even the unconventional ones, in the interest of ESA's scientific achievements and also for your own personal development."*

Giuseppe Sarri: *"I have been awarded an individual prize, for which I thank you, but achievement at ESA is never on account of just one person, so I receive it on behalf of my team and above all I thank them."*

Rolf Martin for the DSA-1 Core Engineering and Procurement Team: *"What you see before you is the core team that worked on this project from the very beginning right up to the end, but behind each of the five people here, you should imagine another three and this will give you an idea of the number of colleagues involved in the success of this project. I would like to thank the whole team, and industry, for their cooperation and the fantastic effort they put in throughout the project. The team also thanks those colleagues who proposed and sponsored us for this award, and the EAP Committee for recognising this important step for the ESA Deep Space Network. It will provide the motivation needed to finish the next Deep Space Antenna in Spain, and hopefully a third one later on."*

Isabelle Duvaux-Bechon for the Eduspace Development Team: *"I would like to thank the CSAC for giving internal visibility to this education project, and to all who supported it. I hope that we will go on with Eduspace, especially as colleagues retire and have to be replaced. Education is becoming an important objective for ESA and teachers, who use this portal, which already exists in English, French, German, Italian and Spanish and will soon exist in Danish. We now need to maintain what we have achieved, and to improve on it."*

Andrea Baldi: *"I am extremely happy to see the importance of IT recognised at the Agency. Wireless Local Area Network (LAN) technology and services will change the way we work. There are now 60 meeting rooms where people can come and work with a permanent connection to ESACOM. The efficiency of people's daily work has considerably improved. I would like to thank colleagues in OPS-I management who allowed this simple idea to become a project with funding; the working group on mobility which carefully studied the needs of ESA staff who are constantly on the move; and I would like to thank the project team and all the staff who are happily using the service today."*

Stephane Roure: *"I would like to thank the persons who proposed me for this award, and to share it with my colleagues of the Mechanical Systems Laboratory: Bernd Lehmann and Cesar Gomez Hernandez. I should also say that, as a B grade, I am particularly pleased to receive this prize. It is gratifying to be recognised in this position."*

>>>

>>> a day of sporting gestures

Winning remarks

Jürgen Fertig for the Mars Express Flight Dynamics Team: *"Mars Express is the first European planetary orbiter. The success of this mission is not our achievement alone, but that of a larger team which we are all part of: ESA. Thank you to the CSAC, to the Administration, to the people who selected us, and to our sponsors, the Ground Support Managers of Mars Express and Rosetta. They are the customers of our service, in this instance flight dynamics support to interplanetary missions, and we like to have satisfied customers!"*

Pascal Gilles for the ENVISAT Payload Data Segment Team: *"On behalf of all the ENVISAT team, let me thank Bryan Melton, Chairman of the CSAC, the EAP Committee and ESA staff for nominating and selecting us for the 2003 ESA Award."*

"We thank our management for entrusting us with this task and for their support and confidence in our success from the start. It was clearly a big challenge, demanding a high level of personal and professional commitment, a major change in our working practices and very tight coordination between all parties involved. But it was also clear to us that we had no alternative but to succeed. I would like to thank especially Jacques Louet, Envisat Programme manager until the end of the Commissioning phase, whose contribution was fundamental to the overall success of the mission."

"Above all, I thank the whole team involved in bringing the Envisat mission to where it is today. The team you see here today is just the tip of the iceberg. Success was achieved through the concerted effort of a far greater number of highly committed individuals, all of whom deserve equal recognition. They are: all the operations teams at ESRIN and in the Kiruna, Matera and Svalbard Stations, the Processing and Archiving Centres in France, Germany, the United Kingdom, Spain, Italy and Finland, the Support to Operations teams in ESRIN, and the maintenance teams including all contractors, and many ESA staff. Furthermore, the team could never have succeeded without the constant support of all our partners such as the satellite operations team at ESOC, the post launch support team at ESTEC and all the services we rely upon here at ESRIN."

"The highest level of motivation should be maintained within the team as it faces the challenges ahead, of which there are many, in particular related to the ever growing expectations from the very large ENVISAT user community."

Bryan Melton (left) and the Envisat Payload Data Segment Team

2003 RUNNERS-UP

Bruno Greco
Earth Observation Applications Engineer (EOP-GDM), ESRIN
For passive calibration of the ENVISAT altimeter backscattering coefficient, a measurement of the altimeter return power which helps to improve sea state observations.

Giuseppe Sarri
Eddington Study Manager (SCI-PTE), ESTEC
For outstanding technical achievement concerning on the Gamma Ray detectors of the Integral payload in his former position as Integral Payload Manager.

The DSA-1 Core Engineering and Procurement Team
ESOC
For ESA's first Deep Space Antenna in New Norcia/Western Australia.
Team members:
Alan Coupe, **Gérard Galtié**, **Marco Lanucara**, **Roberto Maddè** and **Rolf Martin**.

The Eduspace Development Team
HQ and ESRIN
For the Earth Observation Web portal for secondary schools.
Team members:
Isabelle Duvaux-Béchon, **Laurence Ghaye**, **Valerie Hood**, **Jürg Lichtenegger** and **Roger Nay**.

Doing something for the world

Warmth and good humour prevailed as we were both impressed and entertained by the winners…and those presenting the prizes. José Achache (D/EOP) paid a personal tribute to the winning team on "the largest civilian observation satellite ever built."

The ENVISAT Team were unanimous in their decision to donate their winning prize money to charity. Given the very large number of people involved in the success of ENVISAT, "who all deserved equal recognition", this was an appropriate decision for spokesman Pascal Gilles. The money was then donated to "Cooperativa Vivere Insieme" based in Rocca Priora, in the neighbourhood of Frascati. Doing something for this world, the quality of the work and of their vision as human beings is an inspiration to us all. ■

Find further information on the ESA Awards Programme on the Intranet pages under Staff Representation and EAP
http://ids2.esa.int:81/ATTACHEMENTS/A122259/EAPWinners2003.htm

Vote of thanks

Bryan Melton extended thanks to the following:
- Daniel Sacotte for standing in for the Director General at the last minute.
- Johnny Butu for organising the whole process for the third time on behalf of the CSAC.
- The Evaluation Board Members who had a very difficult task.
- The proposers for making the effort to nominate colleagues.
- ESRIN for hosting the event and in particular to Chantal Anselmetti and Christine Violetti.

Special thanks went to Toety Edwards-Hofman for organising the prize-giving ceremony.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A man of many passions

Michel Praet Head of the Director General's Cabinet in Brussels (DG-B)

Born in Elisabethville in the former Belgian Congo, Michel Praet is Belgian and trilingual in French, Dutch and English. Despite his young years, he has 18 years' experience in space policy: in the Belgian Administration (1986-1992), heading the Belgian Delegation to ESA at age 29; in the private sector (1993-1999), and at the Agency itself from 1999.

After graduating in Economics from the Université Libre de Bruxelles, he became Advisor to two Deputy Prime Ministers of Belgium, consecutively Willy De Clercq (1982-84) and Guy Verhofstadt (1986-87). Gaining experience of public administration, industry and international organisations, he was successively Business Development Manager with the IT company Bull; Head of the Space, EC and Eurêka Departments of the Science Policy Office of the Belgian Administration, and Chairman of the International Space Station Programme Board (1993-99). Before joining ESA, he was Director of Strategy for Alcatel Space in Belgium and Deputy Director of Marketing and Sales for Alcatel Space subsidiaries in Europe. He was thus well acquainted with ESA before coming to the Agency as Head of the Liaison Office with the European Union in 1999.

Today as Head of the Director General's Cabinet in Brussels, he sees his role as that of "a bridge" between ESA and the EU in terms of supply and demand. "The budget challenge is to obtain more funding for programmes in order to increase ESA's activities especially with the European Union. Given the recent enlargement of the EU, there is a need for a comprehensive space policy to ensure that we do not forget about the ten countries, which are not members of ESA. We need to bring them on board by responding to areas where there is already a demand, such as Global Monitoring for Environment and Security (GMES), the joint ESA/EC programme, Telecommunications (Digital Divide) and Security and Defence. A further challenge is to address areas where demand is not yet clearly defined, such as development for instance."

Michel Praet is chairman or member of various institutions, being Member of the Strategy Council of the Belgian Minister for Science Policy, Mrs Moerman; Member of the Board of the space scientific institutions of Belgium; Member of the Federal Council for Science Policy; Vice-President of the "Museum for Europe"; Vice-President of the "Palace of Fine Arts" of Belgium (Brussels); Vice-President of "veneziaviva.be".

A self-confessed bibliophile, Michel Praet says that he should perhaps be banned from bookshops, before they bankrupt him! He simply cannot resist buying books (and inevitably bookshelves to put them on). From Condorcet to Jefferson to... Casanova, Michel Praet finds resonance between 18th Century philosophers of the Age of Enlightenment and the third President of the United States, "who swore eternal hostility to every form of tyranny over the mind of man"; while Venetian-born Casanova, is "quite instructive on the morals, science and arts of the time". Michel is also passionate about Venice itself and a founder member of "veneziaviva.be", an association for the protection of Venetian cultural life and architecture with a mission to keep the floating city alive.

Michel Praet is married to Lut and they have two children, David and Julie. ■

Securing ESA's future by protecting its achievements

Gerhard Brauer Head of the Security Office (DG-S), HQ

Gerhard Brauer was born in Geisenheim, Germany, a small town located in the renowned Rheingau winegrowing region of Hessen. He earned his "Diplom-Ingenieur" degree in Aeronautics in 1973 from the Technical University of Darmstadt, and over the past 29 years he has held a number of programme manager positions within the armament organisation of the German Ministry of Defence, conducting development programmes in the field of fighter aircraft and combat helicopters.

He worked for one year as a design engineer in the F-18 Aerodynamics Department of the McDonnell Douglas Aircraft Corporation in St. Louis, Missouri. He was responsible for the procurement of the Helicopter Sea Lynx for the German Navy and the technical integration of a sonar system into this helicopter. In cooperation with the US Navy and international industry, he led the integration of the Advanced Medium Range Air-to-Air Missile (AMRAAM) System into the F-4f Phantom fighter aircraft. Most prominently, he was the German Programme Director for the Franco-German Helicopter TIGER.

Having a vocation to work and further his experience in an international arena, a five-year leave of absence from the German Ministry enabled Gerhard Brauer to work with the German Space Agency, formerly DARA, which merged with DLR in 1997. Then for a further ten years, he served as a liaison officer in Washington D.C. where he coordinated the Aircraft Technology Demonstrator Programme X-31 together with DARPA, the technology department of the Pentagon. Immediately prior to joining ESA, he was the German representative on the technology programme of the Western European Armaments Group (WEAG).

At the "Centre des Hautes Etudes de l'Armement" in Paris, he participated in the "Session Européenne des Responsables d'Armement" (European Session for Armaments Executives), and he is a recent graduate of the Senior Course at the NATO Defence College in Rome.

As Head of the Security Office at ESA, Gerhard Brauer is responsible for forming the new team, supporting and advising the Director General on all security matters. "The basis for security is not limited to the protection of people," explains Gerhard Brauer. "In a globalised information society characterised by intense worldwide

competition, especially with regard to technology, the protection of information, i.e., achievements, market positions, customer rights, etc., has also gained in fundamental importance. Any information leaving ESA's control is available for worldwide misuse and it is ESA's responsibility to ensure that this does not happen."

"Together with my small team, our general goal is to make ESA employees aware of the need for ESA to be protected, continuing the work that has been done in this respect already. ESA's achievements have made this Agency strategically important for the future of Europe, but also an attractive target.

Adequate information protection is a sine qua non, and takes on further significance in view of future involvement in the extended space policy of the EU. We will work on gaining the support of all ESA staff in order to make ESA a secure, and thus attractive partner for the EU as well as for ESA's Member States themselves in future collaborative ventures."

In his leisure time, Gerhard Brauer enjoys cycling and travel. He recently moved to Paris with his wife and has two grown-up sons who live and work in Germany. ■

In touch with reality

Lars Fredén Head of the International Relations Department (EXR-I), Directorate of External Relations,

Lars Fredén, who is Swedish, is a man of action and a true polyglot. He studied Russian at the Swedish Army Language School, and Chinese at the universities of Shandong and Beijing and at Harvard University, Massachusetts. In addition to his mother tongue, English, Chinese and Russian, he also speaks some French, German and Spanish, and has studied a few other languages as well. He studied History and Philosophy and obtained a Master of Arts in East Asian studies at Harvard.

As a diplomat, Lars Fredén worked for the Swedish Embassy in Beirut; the Swedish Consulate General in Hong Kong and was Desk officer for China, Japan and Korea at the Ministry of Foreign Affairs in Stockholm. In the early 1990s he was the first foreign diplomat to be stationed in the Baltic States – then part of the Soviet Union. From 1995, he served as Minister and Deputy Chief of Mission at the Swedish Embassy in Beijing from 1998 until 2002 and Moscow from 1995 until 1998. Just before joining ESA, he was Deputy Head of the Department for Asia and Oceania at the Swedish Ministry of Foreign Affairs.

The time Lars Fredén spent in the Baltics particularly influenced his career. "As the first and for some time the only diplomat in the area, I knew all the players and saw the situation from the inside" he explains. "It was a time of dizzying political change. I never believed the Soviet Union would collapse so quickly. From 1992-1994, I was an aide and emissary to the Swedish Prime Minister as, during these early years of Baltic independence, he was involved in the complex web of negotiations between Tallinn, Riga, Moscow and Washington that ultimately ended in a peaceful and total Russian troop withdrawal from the Baltics."

"The situation there was quite shaky in those years. The legal systems and the police force were in total chaos; borders were still controlled by Soviet forces; there were no functioning constitutions, no armed forces, no agreed borders with Russia; unemployment and poverty were widespread and inflation hit 1000%. What they did have was some 100,000 Russian troops on their soil – plus an incredible amount of ex-Soviet hardware (ships, tanks, aircraft, ammunition). Today Estonia, Latvia and Lithuania are members of NATO and the EU. Their economies are doing very well. With hindsight, the outcome seems obvious, but at the time nobody knew how it would end. I continually flew back and forth as we tried to do our bit to ensure a happy ending."

When asked why he was keen to join ESA, Lars Fredén replies, "It might sound a little surprising but I wanted to do something more concrete. Diplomacy can be rather abstract (the USSR breaking up was an exception!). In the space sector, there is a great sense of achievement when things go well. But things can also go wrong like rockets blowing up or satellites drifting into useless orbits. I felt this dimension immediately at ESA."

"There is also the issue of funding which is not simply available on tap but has to be negotiated with industry and politicians. This aspect again brings ESA into closer contact with reality," he continues.

"I am very pleased to be working at European level, which I find more rewarding than representing just one country. My current position provides me with the unique opportunity to work simultaneously with China, Russia and the USA, countries which have been a constant feature throughout my career," explains Lars Fredén. "It's also a big change to work in an organisation where there are for the moment comparatively few classified documents. I spent 20 years locking safe-boxes and rooms, worrying about forgetting number series and combination locks, using encryption machines, and being concerned about being overheard."

Lars Fredén is impressed with the enthusiasm and professionalism at ESA, "People are passionate about what they are doing. Many are specialists with years of experience in their particular field. In the Foreign Service, this seldom happens because people are constantly rotated. There is a kind of cult of the professional amateur and a belief that diplomats are able to get a handle on any country, task or brief within a few weeks."

History, philosophy and literature remain a passion for Lars Fredén, together with opera and ballet. He has little time however to indulge his interests for the moment, "I am like a student working towards my end of school exams, studying about ESA and the space sector! I do however gaze in wonderment at the architecture in Paris as I cycle to and from ESA HQ every day."

Lars Fredén is holder of Latvia's highest order, "The Order of Three Stars", and the Lithuanian Parliament's "13 January Medal" (in commemoration of the massacre in Vilnius on 13 January, 1991) as well as the Medal of the Riga Barricade Committee "for contributions to the defence of Latvian independence" during the Soviet assault of January 1991. He is a member of the Advisory Board of the Institute of Foreign Affairs in Stockholm.

Lars Fredén has written two books on Swedish policy in the Baltic States in the early 1990s, due to be published later this year. ■

personnel

Special tribute to the SOHO team

With a mission to study the Sun from its deep core to the outer corona, and the solar wind, the Solar and Heliospheric Observatory (SOHO) has been presented with the prestigious Laurels for Team Achievement Award of the International Academy of Astronautics (IAA) – an honour which has been awarded only twice previously, to the Russian MIR Station Team and the US Space Shuttle Team.

This joint ESA-NASA project has benefited from truly international cooperation. Led by ESA and the prime contractor Astrium who built the SOHO spacecraft, it was launched by an Atlas II-AS Rocket on 2 December 1995. It carries 12 complementary instruments developed and supplied by 12 international consortia and involving 39 institutes from 15 different countries. Nine consortia are led by European Principal Investigators (PIs) and the remaining three by US PIs. More than 1,500 scientists from over 30 countries are directly involved in SOHO's research. Originally designed for a two-year mission, SOHO's success has led to two extensions, the first until 2003 and then again until March 2007.

With its 24 hour-a-day observations of our daylight star, today SOHO is an important tool that continues to revolutionise our understanding of the Sun. It is the only tool we have to detect Earth-directed solar eruptions that could potentially harm our technology-based society. In addition to being a scientific observatory, SOHO has also proved to be the most efficient space weather watchdog and International Space Weather Forecast Operations have come to rely on SOHO on a routine basis as a key input to solar observation and geomagnetic forecasting. ■

The Laurels for Team Achievement Award 2003 was presented by the International Academy of Astronautics at a ceremony on 23 September 2003 in Bremen (Germany) in the frame of the IAF Congress. From left to right: (front row) Prof. Roger-Maurice Bonnet (ESA), Paal Brekke (ESA), Michel Bouffard (Astrium), Prof. Martin Huber (ESA), Vicente Domingo (ESA), Fabrizio Felici (ESA), (back row) Harold Benefield (Honeywell), William Worrall (NASA), Rob Harris (Bae Bristol), Bernhard Fleck (ESA) and Francis Vandenbussche (ESA). Missing from the picture: Joseph B. Gurman (NASA), J. David Bohlin (NASA), Arthur I. Poland (NASA), Michel Janvier (Astrium), Ken Sizemore (NASA), Luis Sanchez (ESA) and Chris St. Cyr (NASA).

contact

Paal Brekke
ESA/SOHO Deputy Project Scientist
NASA Goddard Space Flight Centre
Greenbelt, Maryland, USA
Tel: 00 1 (301) 286 6983
E-mail: pbrekke@esa.nascom.nasa.gouv

education

ESA at the "Madrid por la Ciencia" fair 2004

More than 110,000 visitors attended the fifth edition of "Madrid por la Ciencia," the largest and most successful educational fair in Spain. The Madrid Regional Government was responsible for the organisation of the fair with the objective of making science more attractive to primary and secondary school students and the general public by presenting it in a dynamic and interactive way.

This year's edition presented more than 150 stands and involved 60 schools. Preparation for the fair began several months in advance in association with the Spanish Ministries of Science and Education, the main Spanish research institutes, public administrations, regional governments, universities, museums, science academies and school editors.
The Agency, under the initiative of the Education Department (EXR-E), and in close cooperation with the Exhibitions Service (EXR-C) and the Country Desk for Spain participated for the first time in this fair.
It is estimated that more than 25,000 people – most of them students – took part in the activities organised by ESA to explain Space and European space programmes.
The main activities were:

- **Solar System and the Universe:** Mars, Black Holes, the Sun, etc.
- **Getting to space:** How Ariane 5 works, the Rosetta launch campaign, etc.
- **Environment:** Global warming, oil spills, pollution, vegetation, etc.
- **Life in Space:** "Visiting the ISS with ESA Astronaut Pedro Duque"

- **Having fun with Space:** "The Space Quiz"
- **Space applications:** Galileo and satellite telecommunications.

In addition, participants could attend a conference entitled "3,2,1…ESA" in the auditorium, or watch a video on the Cervantes mission with Pedro Duque. ■

contact

Samuel Buisán Sanz
Young Graduate Trainee
Education Department
(EXR-E), HQ
Ext: 9 8020

Maria Menéndez
Head of Exhibitions
Exhibitions Service
(EXR-C), HQ
Ext: 9 7167 / 9 7590

Simonetta Cheli
Head of the Public and Institutional
Relations Office and Country Desk
for Spain, Italy and Portugal, ESRIN
Ext: 80 350 / 351

book review

Watching over the Earth

Les Sentinelles de la Terre
Pour prévenir les nouveaux désordres de la nature
(The Guardians of the Earth – Preventing new natural disasters)

by **José Achache**, Director of Earth Observation Programmes (D/EOP)

Working at ESA, Earth Observation is something we hear about practically every day. But we don't always have a clear understanding of what is really involved in this challenging area, which draws upon both science and applications. And yet it is something of direct concern to all Europeans.

In his book, José Achache explains to non-specialists how the increase in natural disasters (heatwaves, floods, violent storms…) in the last few years, is in fact a sign that climate change has already begun. He also shows that these disasters can be forecasted through the use of satellites which have become part of our everyday lives; how these satellites will be essential tools for security in the future; and how Europe could take the lead in forecasting natural disasters and watching over the environment, for our safety and well being.

To give you a foretaste, here are some of the chapters you will find in the book: Cold War or New Ice age?; Measuring the Earth from space; Generating models of the Earth; Forecasting weather and climate; Preventing natural disasters; Epidemics; Towards an Environmental governance of the planet; The Service Industry.

This book is addressed to a wide audience. It is currently available in French. We will let you know when it will be available in English. ■

Les Sentinelles de la Terre
Pour prévenir les nouveaux désordres de la nature
by José Achache
published by Hachette Littératures (in French)
March 2004, 185 pages, ISBN: 2-01-235733-4

social and sporting

ESTEC's Astronomy Club

Keeping an eye on the sky

The transit of the planet Mercury across the Sun's disc in May 2003 generated a great deal of interest around the world which extended as far as ESTEC. Such was the interest that a short time afterwards, a group of astronomy enthusiasts formed the ESTEC Astronomy Club (ACE). Today, the club has around 30 members who meet twice a month for informal discussions and presentations on astronomy.

The goals of the club are to promote the practice of amateur astronomy among its members and beyond; to organise seminars and visit places related to astronomy; to teach its members how to use telescopes and additional equipment (webcams for recording images of the planets); to meet regularly to exchange information and, weather permitting, to observe the sky using telescopes; to organise special events like observing the transit of planet Venus across the Sun on 8 June 2004.

This year the club plans to buy an easy-to-use, portable telescope, which would be available for members to use. The long-term plan is to set up an observation hut which could house a stationary telescope. ■

Club members observing Mercury's transit across the Sun, June 2003

contact

Raymond Rouméas
Treasurer ACE
ESTEC
Ext: 5 5181
Fax: 5 6064

The ESRIN Motor Club

A passion for cars

Founded in 1994, the ESRIN Motor Club (EMC) brings together car and motorbike enthusiasts wishing to share their passion. All members are car and motorbike owners and some are even privileged owners of vintage or sports models. At ESRIN, EMC provides a centre called "the Drome" where members can come and use maintenance equipment and tools for small repairs to their vehicles. Here, the 25 club members can also consult technical and commercial information available through magazine subscriptions and specialist books.

Over the last few years, EMC has organised a number of social activities including weekend breaks to attend different car rallies. At the annual ESRIN Sports Day, EMC organises a motor show where members and guests can exhibit their cars and motorbikes. The winner is awarded the "ESRIN Motor Cup." ■

contact

Giancarlo Pittella
(EOP-G)
Ext: 80 540
Fax 80 632

Space for life at ILA 2004

Signature ceremony for the production of 30 Ariane 5 launchers at the Berlin Air and Space Show, ILA, 10 May 2004
From left to right: Jean-Yves Le Gall (Arianespace), Professor Sigmar Wittig (DLR), German Chancellor Gerhard Schröder, Jean-Jacques Dordain (ESA), Josef Kind (EADS Space Transportation) and Hervé Guillou (EADS). The event was also attended by the French Minister for Science, François d'Aubert, Rainer Hertrich and Philippe Camus (both EADS).

Over 200,000 visitors attended the International Aerospace Exhibition (ILA), held from 10-16 May 2004 at Berlin's Schönefeld airport.

Space for life, Europe in Space, Deutschland in Weltraum was the name given to the pavilion organised by the German Aerospace Industries Association (BDLI) in association with the German Aerospace Centre (DLR), the German Ministry for Education and Research (BMBF) and ESA at ILA 2004. Visitors to the pavilion were invited to take a journey through the Solar System where Europe's space programmes were highlighted.

This well-known exhibition is organised every two years by BDLI to promote the latest developments and upcoming projects in the aeronautics and space sectors. After the inauguration ceremony on 10 May, the German Chancellor Gerhard Schröder visited the space pavilion accompanied by ESA Director General Jean-Jacques Dordain, Professor Sigmar Wittig, Chairman of the Executive Board of DLR, Rainer Hertrich, President of BDLI and numerous other dignitaries.

"Preparation for ILA started about one year ago," explains Maria Menéndez, Head of Exhibitions (EXR-C) at ESA. "Organising an exhibition is based on guidelines discussed by a team from various ESA Directorates and programmes. It is our aim to highlight European space strategy by using concise, efficient and original communication means to visualise the programmes and convey essential messages on Europe's space activities. The goal of an exhibition is not to explain in detail its entire content, but to stimulate the visitor's curiosity so that he/she wants to find out more."

The Scorpion technology demonstrator robot under development by the University of Bremen with funding from ESA's Technology Programme and DLR, observed by David Southwood, Director of the Science Programme, Dietmar Staffelt, Space Coordinator of the German Government and Parliamentary Secretary of State, Bernd Hofer, Deputy Chairman of the Board of DLR, Ulrike Ragnit, Rosetta Lander Engineer, and Ulf Merbold, ISS Utilisation Promotion Manager.

ILA 2004 covered a floor space of 1,350 m² and provided the setting for a number of important events in which all ESA Directorates were involved. These included the signature ceremony for the production of 30 Ariane 5 launchers, the signature of the ATV Development contract and press briefings with all ESA Directors.

Mrs Edelgard Bulmahn, German Federal Minister of Research and Education is greeted by ESA Director General Jean-Jacques Dordain, upon her arrival at the space pavilion.

During the weekend when the exhibition was open to the general pubic, Edelgard Bulmahn, the German Federal Minister of Research and Education paid a visit to the pavilion as did Manfred Slope, German Federal Minister of Transport and many other official visitors. ■

contact

Maria Menéndez
Head of Exhibitions Service (EXR-C),
HQ, Ext: 9 7167

Wendy Slater
Exhibitions Officer (EXR-C), HQ
Ext: 9 7418

Annie Sorlin
Exhibitions Assistant (EXR-C/EPSEC)
Ext : 9 7590

Fiorella Coliolo
Young Graduate Trainee, HQ
Ext : 9 7416

EXR-C Fax: 9 7690

Farnborough 2004

The biennial Farnborough International Air Show will take place in Farnborough, near London, from 19-25 July 2004 under the aegis of the Society of the British Aerospace Companies (SBAC). For the first time, the organisers have set up an International Space Pavilion (ISP), providing around 2,000 m² of exhibition space.

In this special pavilion, ESA will have its own stand within a European area together with industry, the British National Space Centre (BNSC) and the UK Industrial Space Committee.

ESA will highlight its programmes with special focus on Mars Express, Huygens, Envisat, Cryosat, Galileo, Ariane 5, Vega and the Delta mission to the ISS.

Events and press briefings will be held during the week and a special programme will be set up for the general public at the weekend. SBAC are running a competition in the ISP over the weekend and ESA will provide a trip to Kourou for two as the first prize.

'Farnborough International' will be reserved for trade attendance from Monday 19 to Friday 23 July, 09:30-18:00 and will be open to the public on Saturday 24 and Sunday 25 July, 09:30-17:30. ■

contact

Wendy Slater
Exhibitions Officer (EXR-C), HQ
Ext: 9 7418
Fax: 9 7690

Barcelona 2004

ESA participates in the Universal Forum of Culture in Barcelona, Spain.

ESA is an exhibitor at the new international event the Universal Forum of Culture, which opened on 9 May 2004 in Barcelona.

This event is organised by UNESCO, the Spanish government, the autonomous government of Catalonia and Barcelona's City Council and is expected to attract around 5 million visitors over a four month period (runs until 26 September 2004).

The three main themes of the Forum are:
- Cultural Diversity
- Sustainable Development
- Conditions for Peace

A number of experts from ESA will also take part in debates on issues of global concern.

For further information:
http://www.barcelona2004.org

contact

Maria Menéndez
Head of Exhibitions Service (EXR-C), HQ
Ext: 9 7167

Wendy Slater
Exhibitions Officer (EXR-C), HQ
Ext: 9 7418
Fax: 9 7690

Simonetta Cheli
Head of the Public and Institutional Relations Office and Country Desk for Spain, Italy and Portugal
Ext: 80 350
Fax: 80 352

Exhibitions second semester

4 March-15 September 2004
Temporary exhibition on Navigation
National Space Centre, Leicester (UK)

30 March 2004-30 January 2005
Soleil: Mythes et réalités
Cité des Sciences et de l'Industrie, La Villette, Paris, France

9 May-26 September 2004
Universal Forum of Culture
Barcelona, Spain

26 June-31 December 2004
Planetary Exploration
Science Museum, London, UK

18-25 July 2004
35th COSPAR Scientific Assembly
Palais des Congrès, Paris, France

19-25 July 2004
Farnborough International 2004, UK

6-10 September 2004
Envisat Symposium
Salzburg, Austria

26 September 2004-June 2005
Space Dreams
City Halle, Winterthur, Switzerland

October 2004
Permanent exhibition on ESA Programmes
Eurospace Center, Redu, Belgium

October 2004
International Festival of Meteorology
Cité des Sciences et de l'Industrie, La Villette, Paris, France

4-8 October 2004
IAC (International Astronautical Congress) Vancouver, Canada

27 October 2004-31 January 2005
Au-delà de la Terre, L'Europe explore le système solaire
Observatory of Paris, France

Seeing the ESTEC corridor in a different light

Many of you will be familiar with this corridor, but have you ever seen it looking so good or so empty? Peter Groepper, System Engineer in the Technology Harmonisation and Strategy Division, Directorate of European Union and Industrial Programmes (EUI-PH) and member of the ESA Fine Arts Club rose early one Sunday morning to take this picture when the corridor was devoid of construction material. He brought his own photographic equipment: 25 kg of it! He explains, "In the 30 minutes it took me to take this one photo with my 'large format' 4x5 inch Linhof studio camera, I could have taken several shots with my digital reflex camera."

He explains his choice, "I'd rather take time to produce one good negative as I hate being forced to choose afterwards from a series of shots. What I particularly like about the fully-adjustable 'large format' camera is, that what you see through the lens corresponds more or less to the results on paper. The screen and the negatives are nearly as large as a postcard, so sharpness, rich colour saturation and lack of granularity of a larger print make a difference as well. This purely mechanical camera, built like a tank, looks very old fashioned, but in fact it will last longer than all my other electronic camera equipment!" ■

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Tel: 01 53 69 72 45 / 80 12. Fax: 01 53 69 76 90. E-mail: Anne.du.Fretay@esa.int

Editorial contribution, Design, Layout & Production elton www.ELTON.FR Tel: 01 53 42 12 30. E-mail: elton@elton.fr

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